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Types of Rhodesian Farmhouses.

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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the Journal. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* Journal *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

Farm Homesteads in Rhodesia.—Quite a feature of the agricultural progress of Rhodesia is the substantial class of farm homesteads which are now to be seen in many parts of the country. The illustrations on the opposite page are typical of many others of more or less pretentious structure, all indicating the confidence the owners have in the prospects of this country from a farming point of view. The last few years have seen a remarkable advance in the agricultural development of this Territory, and the fact which has called for these comments is, we consider, not the least happy augury for the future.

THE TOBACCO INDUSTRY.—A Reuter message which appeared in a recent edition of the "Rhodesia Herald" notified that the new Australian tariff included a preference equivalent to 9d. per lb. on South African tobacco. This is a very important announcement, and we understand that the Rhodesian Tobacco Planters' Co-operative Society is making enquiries with a view to ascertaining the exact nature of the preference. Readers of Mr. Finch's article, which appeared in the last issue of the *Journal*, will have seen how the preference evidently intended to be given to South African tobacco under the old tariff was inoperative owing to another clause which permitted tobacco from other countries to enter on equal terms. This anomaly was explained by Dr. Nobbs on his return from Australia early in 1913, and we understood then that representations were going to be made on the subject by the local society. The point now to be elucidated is whether the preference is a *bona fide* one. If it is, then herein lies an opportunity which should be fully grasped.

Dr. Nobbs told us that our tobacco created a favourable impression in Australia, and the following remarks made by him in the article he wrote in the April, 1913, number of this *Journal* should be noted:—"A number of the larger tobacco manufacturers are understood to be united in a trust, although this is denied by them. The so-called combine appears to be mostly concerned in cigarettes, and keenly interested to secure suitable leaf, which it is having increasing difficulty each year to obtain. If this alliance of big manufacturers can be induced to take our tobacco, which seems only a question of prices, it is not unlikely it would want it in enormous quantities." With such a market as this, in addition to the South African demand, Rhodesia would appear to be extremely well situated, and we await with very much interest the result of the enquiries now being prosecuted.

SALISBURY FAT STOCK SHOW.—Last year, on the occasion of the first Salisbury Christmas Fat Stock Show, we expressed the hope that it might become an annual event. So far this wish has been fulfilled in the holding of Messrs. Whitfield & Co.'s second annual Fat Stock Show on the Market Square at Salisbury on the 23rd December.

The champion bullock at the Salisbury Fat Stock Show, 23rd December, 1914.

In the cattle section the number of exhibits which faced the judges was fair, but considered as a whole, this section cannot be pronounced to have been up to the mark it should have been for a fat stock show. Many of the animals were only in the condition known amongst cattlemen as "store condition," and whilst others were in "good store condition," really fat cattle were not encountered until one came to those pens of animals that had attracted the eyes of the judges and been awarded cards.

A subject of discussion at the show was the question as to whether it would not have paid some of the owners to have fed their cattle for two or three months upon food grown and harvested on the farm, including mealies. The prevailing opinion was that by so doing the extra price that would have been obtained for the bullocks would have more than compensated for the cost of the food consumed. What is really wanted is a man to take the lead and make a practical success of this method, which would sooner or later become one of the ordinary systems of farming in Rhodesia, as it has in many other countries.

The judges, Messrs. C. R. Edmonds (Acting Chief Veterinary Surgeon) and C. Heanley, apparently did not have much difficulty in arriving at their decision as to the best pen of two bullocks on the show, a pair of three-year-old crossbred Aberdeen Angus beasts, owned and bred by Mr. A. W. Partridge, at Lendy Estate, Marandellas, commanding immediate attention, and obtaining the cup, value £30, presented by the butchers of Salisbury. These were sold for £27 10s. The cup, value £25, presented by Mr. W. H. Williamson, for the champion beast on the show, also went to one of these animals, a very neat, compact beast out of a Mashona cow. His pen mate, a slightly taller animal out of a colonial cow, wanted more time to put "finish" on.

The pair were a decided credit to their exhibitor. It may be mentioned here that, both at the last Salisbury Agricultural Show and the Bulawayo Agricultural Show, as well as the show just mentioned, grade Aberdeen Angus bullocks at three years old have been exhibited which have yielded dead weight carcases between 600 and 700 lbs. of excellent beef fit for any market. Up to the present the Aberdeen Angus grades have held the sway in competitions for beef bullocks, but their premier position will no doubt be more severely contested during the next two years, when the young bullocks at present in the country, sired by bulls of other beef breeds, arrive at show age.

A pen of two pairs of native bullocks exhibited by Mr. Sid Arnott were awarded a highly commended card, which was richly deserved. The owner is to be congratulated upon the condition of his animals, but the fact of his exhibits being considerably older and of less weight prevented them from seriously contesting the premier position.

In the sheep section 170 sheep and lambs were shewn, but with the exception of the prize-winners and one or two other pens, the general condition was not all that one would have wished. The cup, value £9 9s., presented by Messrs. Whitfield & Co., for the best pen of sheep, was secured by Mr. S. Harnden of Silver Bow, Rusapi, with a good pen of cross-bred wethers (probably merino-native cross). These fetched 39s. each. Mr. Harnden himself presented a prize of £12 12s. for the best pen of lambs, and this was deservedly awarded to a beautiful pen exhibited by Mr. J. J. Black. These lambs, 5 months old, were bred out of half-bred Shropshire ewes by an Oxford Down ram. Mr. C. C. Macarthur was a good second with a pen of lambs by an Oxford Down out of Persian ewes. Mr. Wilson also had some very nice lambs out of Persian ewes by a Cape fat-tailed ram. Mr. R. C. Simmons, Chief of the Animals Industries Branch, judged this section.

Consideration of the prize-winners seemed to indicate strongly that, in accordance with the opinion we have long held, one or other of the English short-woolled mutton breeds is likely to prove most useful to us in the production of early mutton of good quality. How far rams of these breeds may be used, or which of them is the best, cannot yet be said, but there seems no doubt that if put to ewes of good big frame (not pure merino) a most marked improvement on our local product usually results.

Pigs were very disappointing in point of number, and one had confidently expected to see more. Mr. Pascoe's prize-winning exhibit of three bacon pigs somewhat made up in excellence of quality for the lack of numbers, and we should like to see many more such on the local market. Mr. G. Neill, Manager of the Bacon Factory, judged this section.

Over 100 turkeys, 100 fowls and some 25 ducks were also exhibited, the majority of which were in very fair market condition.

AN EXPORT TRADE IN MEAT.—The question of the possibility of establishing an export trade in meat has for some time past been engaging the attention of agriculturists in the Union, and an experimental shipment of beef from Natal to England was recently made. A portion of this shipment, we understand, met with a good reception, and prices sufficiently remunerative to give general satisfaction were realised.

The question of disposing of our surplus meat supplies is an important one to this country, and events in the South are being closely followed up here. The whole matter is, of course, only in the embryonic stage at present, but it is well that we should thus early give the question in all its bearings careful attention.

There are naturally many difficulties to be overcome before an export trade in meat can be established, but we can really see none which are insuperable and which have not had to be surmounted elsewhere.

The first essential factor is that there must be stock in sufficient numbers of suitable condition and quality to maintain a regular supply of carcases. At the present moment it is estimated that in Southern Rhodesia we require a million more head of cattle before carcases can be shipped in sufficient numbers and with the requisite regularity to obtain a profitable transport rate. A large percentage of the stock at present in the country is not suitable for export, but no doubt much of this can be used for canning in the country. It is absolutely essential, if we wish to export our surplus supplies of stock as carcases, that our native types be graded up. There would appear to be little difficulty in this, as many first cross animals have already proved themselves capable of fulfilling the requirements of the English market.

With regard to quality. If we decide that export is the most suitable outlet for disposing of our surplus stock, then our methods of grazing and feeding will have to be improved upon, for, generally speaking, our cattle are only fit for slaughter at a certain period of the year. This difficulty can be overcome, and it has been shewn that store cattle can be finished in the richer mealie-growing districts of the country, and turned out at the required weight at about 3 or 4 years old.

With regard to the process of export, as the Union Trades Commissioner points out in a very comprehensive report he has prepared on the subject, this means that very costly and expensive slaughtering and refrigerating plants must be erected. In countries where an export trade is established, the work of preparing the carcases for shipment is undertaken by private enterprise, and of course the very considerable outlay involved is not incurred until the time is ripe. In this connection the Union Trades Commissioner mentions that the London representatives of some of the leading packing houses expressed themselves as follows:—"When you have the cattle and sheep in sufficient numbers and in a fit condition for this market, we will be there to buy them, and we will put up the packing houses."

There is no doubt that there is splendid scope for this country in the meat export industry. Areas devoted to stock raising are becoming more and more limited every year, while the demand for meat is constantly increasing. The war will practically mean the extermination of cattle in several of the countries of Europe, and meat supplies will have to be obtained from overseas.

We are glad to see that the subject is being well ventilated, and we hope that before long it will be possible to evolve some definite system as to the lines upon which the breeding of cattle in this country should proceed.

THE FEEDING OF PIGS FOR THE BACON FACTORY.—Although many of the pigs received by the B.S.A. Company's Bacon Factory are of first-class quality, we are informed that the proportion of pigs which are "soft" is still very great. We cannot expect everyone to become an expert pig feeder in a few months, but we take this opportunity of reiterating the necessity for care and attention to modern methods of feeding if the bacon industry of this country is to be a success. We feel confident that if the farmer will feed carefully, the factory will do the rest, but the cleverest factory manager in the world cannot make good bacon out of badly fed pigs. For information on this subject we would refer our readers to an article entitled "The Breeding and Feeding of Pigs for Bacon Factory Purposes" which appeared in the *Agricultural Journal* for February, 1914, and which can be obtained in bulletin form from the Department of Agriculture. One of the best works we know on the subject, and one which should be helpful to the farmers of this country, is a book entitled "Pigs and their Management," by H. W. Potts, issued by direction of the Minister for Agriculture of New South Wales, and obtainable from Messrs. Juta & Co. of Capetown for six or eight shillings.

NAPIER'S FODDER.—The demand for Napier's fodder this season was so large that the amount allotted to each applicant as a free issue was reduced to about a dozen rooted slips. Several applicants have expressed regret at being unable to obtain large quantities on payment, with a view to starting large plots. As a result of these demands arrangements are being made to supply from the Gwebi Experiment Farm lots not exceeding 200 rooted slips to each applicant at 5s. per 100, delivery to commence towards the middle of February.

SPRING VERSUS WINTER CALVES.—We have been asked by a correspondent to invite discussion and opinion as to the most suitable time of the year for cows to calve down. The question hardly applies to the dairyman, who must, if he is to run his business on modern lines, arrange for his cows to calve down both in spring and in winter, when good shedding, proper provision of food, etc., will to a large extent overcome most of his difficulties. It may be in some cases unprofitable to dairy at all in winter time, which obviously means spring calving, and leaves no choice in the matter. Our correspondent, we take it, had in mind ranching cattle, or cattle which run at large all the year round, or are not required primarily for dairy purposes. Nature's rule is the spring time, and this would therefore seem to be the best time for calving if cattle are being ranched, that is to say, allowed to run entirely at large night and day except for dipping, etc. It is, we believe, generally considered wise to arrange for cows to calve in October and November as much as possible, in order to guard against an abnormally late spring and to avoid the very wet months of December, January and February. Under the older and more primitive conditions of farming, certain tick-borne diseases were avoided by having the cows calve in winter, when tick life is not so active, but dipping now counteracts the risk of tick-borne diseases to a very great extent. Our experience has invariably been that a dry or drying-off in-calf cow will stand the winter better than a cow with a young calf at foot. We know, however, that opinions differ on this point, and no doubt local conditions must be taken into consideration. We shall be glad to hear the views of correspondents on the point raised.

A Farming Calendar.—Under this title we introduce a new feature in the *Journal*, in the form of a brief summary of the conditions which may be looked for during each month. The calendar will include notes on matters relating to live stock calling for attention, together with particulars as to crops and cultural operations and other seasonable comments which it is hoped may prove helpful to our farmers, more particularly those without long experience of this country. It will be readily understood that such advice, necessarily prepared in advance, can only relate to normal seasons and average circumstances, and that allowances must be made for variations both of season and situation. Every individual can readily do this for himself. No attempt is made to explain methods or processes, but it is merely hoped to give useful hints as to the time for carrying out ordinary farm operations and to furnish a calendar of farm work. For assistance in the compilation of this calendar our cordial thanks are due to Messrs. Walters, Lewis, Jack, Farmer, Boocock, Sheppard, Sworder, Eddie, Simmons, C. R. Edmonds and Rev. E. Goetz.

Suggestions or criticisms, with the object of making this section useful and helpful to all classes of farmers, will be welcomed.

COLLECT ON DELIVERY SYSTEM.—As from the 1st February, 1915, the Beira & Mashonaland & Rhodesia Railways are introducing the collect on delivery system in respect of small consignments of farm produce, such as cheese, butter, meat, poultry, eggs, bacon, ham, cream, jam and vegetables. Under this system the farmer, or producer, will be able to deal direct with the consumer for cash, the Railway collecting the value of the goods on delivery, and paying it over to the sender, less a small charge for commission. The system has been in force for some years in the Union, and we understand has worked very satisfactorily. Its success, of course, depends to a very great extent upon quick delivery by the Railway, and we presume there will be nothing to complain of under this head.

COMPULSORY DIPPING OF CATTLE.—The *Government Gazette* of 31st December contains a notice declaring the greater portion of the Salisbury native district a compulsory dipping area. The Administration has been supported in the action it has taken by the farmers of the district, and we feel sure that the application of the regulations will lead to good results.

ORCHARDS INSPECTION ORDINANCE.—The Orchards Inspection Ordinance has been promulgated and placed on the Statute Book. The provisions of the Ordinance were fully explained in the August number of the *Journal*, and it is not necessary now to recapitulate them. The Ordinance had not, at the time, been finally approved by the Legislative Council, but it received the sanction of the House at the October session, with a slight addition to a certain clause.

Briefly, the object aimed at is the controlling of pests of fruit trees, and it should be remembered that if it is deemed necessary for the eradication of a pest, trees can be destroyed by the order of the officer responsible for carrying out the measures of the Ordinance.

The principles of the Ordinance were approved by the Executive Committee of the Agricultural Union, and we feel sure fruit growers will recognise that their interests are being safeguarded by the adoption of the measures in question.

EXCHANGE AND MART.—A correspondent has written to us suggesting that an exchange and mart be opened in the *Journal*. We think the idea a good one, and shall be glad—if farmers will notify us of anything they wish to exchange—to publish the information on the page we have set aside for this purpose.

REDUCTION IN RAILWAY RATE FOR FERTILISERS.—We are pleased to see that the Beira and Mashonaland and Rhodesia Railways announce a further reduction in the rate for fertilisers. The reduction is a substantial one, and will, we are sure, give great satisfaction to the farming community. The new rate comes into force as from 1st March.

CLOSING OF GATES ON ROADS.—Government Notice No. 505, which can be found at the end of this *Journal*, provides that, in terms of section 25 of the "Fencing Ordinance, 1904," travellers omitting to close gates on a public or private road after having passed through them shall be liable to a fine not exceeding £10, or in default to imprisonment for a period not exceeding three months. Farmers have had good grounds for complaint in the past at the neglect of travellers to close gates behind them, thus nullifying the effects of expensive fencing, and we have no doubt that the penalty which can now be inflicted will go a long way towards mitigating the evil.

Enquiries Regarding Poultry Matters.—We are pleased to announce that we have made arrangements with Mr. Frank Sheppard, the writer of the articles on poultry keeping which have for some time now been appearing in the *Journal*, to answer any enquiries regarding this subject. Mr. Sheppard, prior to coming to this country, had a lengthy experience of poultry breeding in all its phases in England, while since his arrival in Rhodesia he has been engaged in rearing birds on a large scale. Like all poultry keepers in Rhodesia, Mr. Sheppard is earning his experience, but we think the extensive knowledge he has of the subject will enable him to afford valuable assistance to anyone seeking advice upon the kindred matters connected with poultry keeping. Enquiries should be addressed to Mr. Frank Sheppard, Post Office, Salisbury.

Bulawayo Agricultural Show.—News has reached this office of a bull due to arrive from England, bought to the order of one of the Matabeleland delegates of the Farmers' Tour, with a view to competing for the 1,000 guinea trophy. This news may serve as a reminder to other prospective exhibitors that the time to begin the preparation of their exhibits is at hand.

Statistics.—The statistical returns from farmers are coming in very satisfactorily on the whole, and it is pleasing to record that there has been little or no reluctance to furnish the particulars asked for. Indeed, on the other hand, in many cases additional information has been volunteered relating to crops other than those designated by the regulations, viz., maize and tobacco; while there is a very widely-expressed desire that other crops, such as kaffir corn, potatoes, monkey nuts, and citrus fruits should be included in future schedules. These, and many other valuable suggestions, are being noted, and will, no doubt, be subjects for discussion at the forthcoming meeting of the Agricultural Union. There are still some few individual returns to come in, but provided these are received within a reasonable time, it is hoped to be able to publish a portion, at least, of the results, as regards the whole Territory and the several districts, in the next issue of the *Journal*.

Ensilage.

By J. A. T. Walters, B.A., Assistant Agriculturist and Botanist.

The practice of providing succulent winter foods in countries such as Rhodesia, where the dry winter conditions render the provision of green herbage a matter of great difficulty, has generally followed three main lines—the making of ensilage; the putting down of permanent pastures, such as dhal, Napier's fodder and other crops; and the storing of root crops, such as mangels, pumpkins and melons. All three methods have their advantages, and there seems to be no reason why every well stocked farm should not have its supplies of each one of these classes of food stuffs in addition to the quantities of hay and forage made and stored in the usual way.

The high place that ensilage holds is seen to be well deserved when an endeavour is made to estimate the market value of the produce obtained compared with the cost of producing it. An acre of mealies grown for ensilage should produce 8 to 10 tons of green fodder if cut at the right time. Properly made ensilage is easily worth £2 a ton in Rhodesia, where late cut veld hay fetches £1 10s. to £2 a ton. The total value of the ensilage obtained would thus be worth (say) £16 an acre. The total cost of producing ensilage in the Transvaal is thus given by Mr. Burtt-Davy (quoting Holm) in his book on "Maize":—

	£	s.	d.
Ploughing, cultivation, seed and seeding ...	1	15	0
Cutting and hauling to silo	1	15	0
Chaffing and pitting	1	10	0
	£5	0	0

This statement of cost is, in my opinion, high for Rhodesia, but even at these figures it shews a profit of £11 to £15 an acre.

Ensilage is the term applied to green fodder which has been preserved in an air-tight pit or silo or in an open stack, and which undergoes a certain amount of fermentation in the course of storage. Almost any kind of green fodder may thus be preserved, and fermentation will take place naturally, being limited only by the quantity of air that is allowed to get access to the green fodder. If too much air is allowed too much fermentation and decomposition takes place. For this reason the fodder is stored in a pit or in an overhead silo, where it is covered with earth or some other protective material. If stored in a stack, the free access of air on the outside causes a good deal of waste through decomposition, although this waste does not penetrate inwards more than one or two feet from the outside when the fodder is well packed and well weighted on top. At the same time a certain amount of air is necessary to promote the required fermentation, and so when a pit or silo is being filled this is done slowly at the rate of about three to five feet a day. The action of fermentation can be detected by the heat produced in the fodder, and the amount of heat produced is the farmer's guide to the proper preparation of his ensilage. A thermometer, such as that used in tobacco barns, is the right instrument to use for gauging the amount of heat evolved. This should be inserted about three feet below the packed surface, and the heat registered will indicate the quality of the ensilage that will be produced, thus—

Under 120 deg.—sour silage.
120 deg. to 130 deg.—silghtly acid.
130 deg. to 140 deg.—sweet green silage.
140 deg. to 160 deg.—sweet brown silage.
Over 160 deg.—burnt.

The best ensilage is made at about 130 deg., and is neither sweet nor sour, but it should be remembered that sour silage keeps better when opened than sweet silage. The method of regulating the heat is as follows:—If too much heat is produced, fill the pit faster and tramp the silage as soon as it enters the pit. If too little heat is produced, and the temperature is below 120 deg., fill the pit more slowly, and do not tramp the silage until the following day. If a thermometer is not available, the amount of heat can roughly be gauged by inserting the forearm in the fodder. 130 deg. is the heat at which a hot bath can comfortably be taken. It only remains to add that when the pit is filled, a considerable settling down of material takes place, so that the pit will need filling about three feet above the level of the ground, in order that when it has finally settled it may be at ground level. It is also necessary to cover the pit on top with a thick layer of grass and a foot or two of earth, to prevent completely any further ingress of air once the pit is filled.

The amount of moisture in the plants to be used for the making of ensilage is an exceedingly important consideration. The ideal silage contains about 75 per cent. water, and no material should be used which contains excessive moisture or is too dry, although in the latter case a sprinkling of water when filling the pit will help to rectify the balance. Crops like velvet beans should be used when in the flowering stage, Napier's fodder when full grown in April or May, and maize in five to six weeks' time after the date of the appearance of the flowering tassel and silk. This is the right period for the cutting of maize for ensilage, and the farmer who observes the appearance of the tassel in the field knows that he has five weeks in which to get his pit ready. The following table, based on American analyses, and adapted to Rhodesian conditions, shews the moisture content per acre of maize at different periods of growth.

Period of growth.	Water.	Dry matter.	Percentage of water.
Date of tasselling ...	10,000 lbs.	1,100 lbs.	90 per cent.
3 weeks later ...	17,500 ,,	2,900 ,,	85 ,,
5-6 weeks later ...	15,600 ,,	4,500 ,,	77 ,,
8-9 weeks later (crop ripe)	12,500 ,,	5,000 ,,	71 ,,

From these figures it will be seen that at about *the fifth to the sixth week after flowering* the maize plant contains the desired quantity of water, and also contains almost the maximum amount of dry matter. The cobs are then well past the milky stage and are glazed. This, then, is the stage at which maize can most advantageously be cut for ensilage.

Maize is undoubtedly the forage plant *par excellence* for the making of ensilage. Almost all the forage plants may, however, be used, due regard being paid to the question of moisture as stated above. With or instead of maize any of the following crops can be used for ensilage:—Kaffir corn, manna or millet, veld hay, Napier's fodder, teosinte (*euchlœna mexicana*), pearl millet, paspalum or any other hay. All these belong to the grass family of plants.

The addition of a leguminous crop to one of the grass crops is a great advantage in adjusting the nutritive ratio of the ensilage, and no better crop can be desired for this purpose than the velvet bean (*Mucuna utilis*). This plant, which does so well in Rhodesia, is a climber, and utilises the maize stalks as supports. It is a slower grower than maize, and should be planted about a fortnight earlier, the maize being then planted alongside, or in the same row as the young velvet bean plants. Lucerne, cowpeas, kaffir beans, Egyptian clover, beggar weed, field peas, ground-nut tops or dhal are other leguminous crops that may be used in the same way, and should all be cut in the flowering stage.

There is still one other plant recommended by American writers for inclusion in the constituents of the ensilage pit—the sunflower, the heads only being used. If the crop is sown at the same time as the maize, the heads will then be ready for cutting at the required time. The quantity recommended is one acre of sunflower for every four acres of maize, the sunflowers to be sown separately. These three constituents—one grass crop, such as maize, one leguminous crop, such as velvet bean, and one oil crop, such as sunflowers, in the proportions specified—are calculated to give an almost ideal ensilage, containing the requisite quantities of carbohydrates, protein and fat respectively for a balanced ration. The farmer's diary for ensilage would therefore appear somewhat as follows:—

7th January—4 acres of velvet beans sown in rows 3 ft. apart.

14th January—1 acre of sunflowers.

17th to 20th January—4 acres of maize sown near or in the same rows as the velvet beans, or sown separately.

28th March (or thereabouts) First tasselling observed in the maize.

1st week of May—Cutting and pitting ensilage.

It is well not to start feeding ensilage until fermentation has ceased, i.e., not for about 6 to 8 weeks after the pit has been closed. It is held that silage is improved by the addition of salt, and Wrightson recommends the use of 1½ lbs. of salt for every ton of green material used.

A matter of great importance to the farmer is an estimate of the acreage of fodder that has to be grown for ensilage in order to feed a given number of cattle for a given number of weeks. The following formulas will enable the farmer to gauge both the acreage he will require to grow and the size of the pit or silo he will require to construct:—

1. The quantity of ensilage recommended to be fed is about 30 lbs. per day per beast.

2. An acre of maize or maize and velvet beans weighs about 8 tons at the time of cutting. This will produce about 7 tons of ensilage.

3. Multiply the number of cows by the number of weeks to be fed and divide by 50. This will give the number of acres to be put under ensilage maize. Example: Forty cows or oxen require to be fed on ensilage for 12 weeks. 40 by 12 equals 480, divided by 50 equals 9 3-5, say ten acres.

4. Size of pit. For every ton of ensilage allow 60 cubic feet; for every acre of ensilage allow 400 cubic feet.

5. Conversely, if the pit has been dug, it will hold for every 60 cubic feet content one ton of ensilage; and for every 400 cubic feet one acre of maize need be grown to fill it.

6. The following table will save the farmer the trouble of working out formulas:—

No. of cows or oxen to be fed for four months.	Quantity in tons of silage required.	Cubic content of silo or pit required.	Acreage of maize needed.
6	11 tons	900 cub. feet	2¼ acres
9	16½ "	1,300 "	3¼ "
15	28 "	2,100 "	5 "
20	37 "	2,700 "	7 "
25	46 "	3,500 "	8½ "
32	59 "	4,800 "	12 "
72	133 "	10,800 "	26 "

The above figures for the acreage necessary for the maintenance of a given number of cattle will vary slightly according to locality. Thus, in districts like Mazoe or Umtali, or on rich lands generally, a slightly lower acreage will suffice; while on sand veld the figures should be a little higher.

The complaint once frequently heard, that cattle refused to eat ensilage, is no longer heard now that ensilage is correctly made and in general use everywhere. The amount usually recommended for feeding is about 30 lbs. per day, and this is the amount allowed for in the calculation of the above tables. Rations for the dairy cow, based on the feeding of 30 lbs. of ensilage daily, have been specially prepared by Mr. R. C. Simmons of the Animals Industry Bureau, and appear elsewhere in the present issue of the *Journal*. These will serve as a most useful guide to the farmer, and may lead to an extension of the preparation of what is undoubtedly one of the most useful and profitable of winter feeds for Rhodesia.

The Feeding of Ensilage to Dairy Cattle in Winter.

By R. C. Simmons, Chief of the Animal Industries Branch.

In order to approach this subject properly, one must make a short survey of the need for feeding dairy cattle in winter and the means at hand for feeding them. In a former article by the writer, entitled "The Principle of the Winter Feeding of Dairy Cattle" (published in the October, 1914, issue of this *Journal*, and subsequently as Bulletin No. 190), an effort was made to shew the various factors which must be considered in providing for the artificial maintenance of cattle. It is proposed to deal with the present subject in ordinary everyday language, and to avoid the use of technical terms as much as possible.

During the present month of February, and during March, the veld may be said to be at its best, and cows require little, if any, artificial food beyond perhaps a handful of maize meal, or something of that kind, to keep them in the habit of coming up quietly to be milked.

So soon, however, as April is reached, most cows in full milk will require some artificial food, and will continue to require it in increasing quantities and of varying kinds right up to the beginning of the next rains, after which less and less is required, till the ration ceases again with the advent of February. It is, unfortunately, somewhat late now for planting, but with regard to many foodstuffs there is still time to make provision for the coming winter, and those who have milking stock of a grade anything above pure native will do well to give the matter serious attention.

The two principal questions which arise are:—(1) What sort of foods must be provided? and (2) How much of each kind will be needed? There are three main kinds needed, namely, concentrated foods, such as maize, beans, peas, buckwheat, rye, linseed and all mill products; cured bulky foods, usually called roughage, such as veld hay, teff grass hay, velvet bean hay, monkey nut vines, maize stalk hay (stover), etc., etc.; succulent foods, such as ensilage, pumpkins, melons, roots, green forage, green maize stalks, etc. One or other at least of the foods mentioned in each of the above groups can be provided on most farms. On arable farms in rich agricultural districts there will be little difficulty in providing any of them, besides many others. It is on the dryer and higher granite farms that some difficulty will perhaps be experienced. In considering the subject, then, the writer proposes to keep in his mind's eye the position on such granite farms, believing that a line of action applicable to richer farms can easily be deduced from his recommendations by the practical farmer.

One of the hardest things to provide in sufficient quantities throughout the winter, and one which, in a very dry year, is perhaps the most important of all, is succulent food. Dairy cattle must have sufficient bulk of succulent food as a substitute for that which they get in a natural way from the veld in summer. Now, it may safely be said that on lighter and dryer farms ensilage is the standard succulent food in winter. Important and valuable as ensilage is, it does not provide all that is necessary for the cows at all times of the year. It is usually lacking in nitrogenous substances, and a sufficient quantity of solid matter cannot always be provided by means of it alone. As the year progresses the veld grass gets less in quantity and deteriorates in quality; therefore, winter rations must be compounded with a view to making them approximate in quantity and quality to the food obtained by cattle on good grazing in summer. To use ensilage, then, to the greatest advantage, it is necessary to use it in conjunction with other foods, and it is the object of this article to point out some ways in which this may be done.

Referring again to the writer's previous article, "The Principle of the Winter Feeding of Dairy Cattle," we find—

(1) That the average cow of this country requires at least 24 lbs. per diem of dry matter (*i.e.*, matter free from moisture of any kind).

(2) That when grazing naturally on good veld, a cow will pick up daily about 100 lbs. of grass, thus shewing that a considerable bulk of food is required if she is to thrive and avoid a feeling of hunger.

(3) That for the production of milk and for the proper maintenance of the cow's body, the food must contain, within more or less narrow limits, certain proportions of nitrogenous and non-nitrogenous or starchy foods.

Bearing these facts in mind, let us proceed to consider what foods will be required from April onwards, taking 30 lbs. per diem per cow as a convenient unit in considering the ensilage part of the ration. The simplest way to do this will be perhaps to take various sample rations, arranged in accordance with the above-referred-to requirements of the cow, and to explain the reason of the particular composition of each.

(1) A ration for use in early autumn when the grass is still plentiful and good, but getting dry:—

Ensilage	30 lbs.
Maize meal or crushed and soaked maize	5 lbs.
Green maize stalks	10 lbs.

At this time of year the cows will pick up at least 50 lbs. per diem of grass, but it will be dry. The ensilage, therefore, is added for bulk and succulence; the maize meal to supply dry matter, and the green maize stalks for further bulk and succulence.

(2) A ration for use about June to August on farms on which green forage can be grown in vleis or under irrigation:—

Ensilage	30 lbs.
Maize meal or crushed and soaked maize	3 lbs.
Green forage	10 lbs.

This ration is practically the same as No. (1), but as green forage is a better food than green maize stalks, the maize ration is reduced somewhat.

(3) A ration for use in late winter, when the grass is less in quantity and quality, but when the cattle still get a fair bite:—

Ensilage	30 lbs.
Maize meal or crushed and soaked maize	5 lbs.
Bean meal	2 lbs.
Majordas or melons	10 lbs.
Veld hay	as required

The ensilage again supplies succulence and bulk, but at this time of year 30 lbs. per cow per diem is scarcely enough, so 10 lbs. per diem of melons or the like have been added. The maize meal supplies dry matter, the bean meal the bulk of the nitrogenous matter (now sadly lacking in veld grass), and the veld hay, with which cows may be racked up at night, is a cheap form of additional bulk.

(4) A ration for use for cows in full milk getting practically nothing from the veld, as, for instance, at the end of a dry Matabeleland winter:—

Ensilage	30 lbs.
Maize meal or crushed and soaked maize	5 lbs.
Bean meal	3 lbs.
Linseed meal	2 lbs.
Maize stover	15 lbs.
Pumpkins, melons, majordas, or roots	8-10 lbs.

In this case practically all the necessary food must be found artificially. The ensilage and melons or roots are the succulent portion, the maize meal, bean meal and linseed meal make up the requisite dry matter, and the two latter the bulk of the nitrogenous matter. The maize stover supplies dry matter and bulk.

(5) A ration for use under the same circumstances as No. (4):—

Ensilage	30 lbs.
Maize meal or crushed and soaked maize	5 lbs.
Monkey nuts	5 lbs.
Maize stover	15 lbs.
Veld hay	as required

In this ration the writer considers that the monkey nuts will make up the necessary nitrogenous matter supplied by the bean and linseed meal in No. (4), and will, in addition, by reason of the oil they contain, obviate the necessity for the extra 10 lbs. of melons, etc., used in ration No. (4), their place being taken by veld hay to make up bulk.

(6) A further ration for use under extreme winter conditions:—

Ensilage	30 lbs.
Maize meal or crushed and soaked maize	5 lbs.
Buckwheat meal	5 lbs.
Good veld hay	10 lbs.
Pumpkins, majordas or melons	10 lbs.

This last ration contains buckwheat meal to supply the nitrogenous requirements. Buckwheat has not the oil that monkey nuts have, so the 10 lbs. of pumpkins or melons of the No. (4) ration have been again included. Good veld hay is used to add bulk and quality to the ration generally.

The reader will notice that the total weight of any one ration recommended, even for extreme winter conditions, does not nearly approach the weight which the writer has stated is utilised by cows grazing at large on good pasture. The reasons for this are as follows:—In the first place, no farmer will allow his cows to walk long distances, unless by so doing they are likely to obtain food or water. It is presumed, therefore, that cows on the full ration will take little exercise beyond perhaps an hour or so a day, just to allow the stables to be aired. A great saving of food is thus effected, as much less is consumed in the form of fuel or energy to move the cow's body about. Secondly, the large weight consumed by cows grazing at large is of a succulent nature, *i.e.*, it contains moisture. Much of this moisture is required to replace that evaporated from the bodies of cows grazing in the open in summer. The reduced weight of food required in winter, or under partial winter conditions, will thus be understood, but if it should be found that the ration advised is too little, veld hay or something of that kind will always adjust matters. In all cases a good constant, clean supply of water should be available.

To quote Mr. Pape, late of the Union Agricultural Department, when writing on the same subject, the foregoing rations must in no wise be taken as recipes. The writer feels confident, however, that they may be taken as a guide to enable the farmer to make adequate provision against winter in accordance with the number of stock which he proposes to feed. They will serve also as a basis on which to commence feeding, to be amended in accordance with the varying circumstances of individual cattle, land and climatic conditions, as the daily intelligent observations of the feeder may dictate.

In conclusion, it may be as well to point out that just as one must make progressive additions to the food of cows as winter approaches and wears on, one must deduct from their food in the same progressive manner when succulence, nitrogenous matter, and so on, again begin to make their appearance in the veld with the return of summer. In this respect it is not uncommon for feeders to reduce all concentrated rations rather suddenly so soon as green grass is available, which, in the writer's opinion, is a most unwise thing to do. It should be remembered that (as is common knowledge) new green grass is what we usually term "washy" until it has acquired some age, which, in a normal year, will be about February. As a matter of fact, at this stage it contains too much moisture and too little solid matter to supply the needs of cows in full milk, and the writer has found by actual test that a supply of good sweet hay, or say from 3 lbs. to 4 lbs. of maize meal per diem, is a valuable addition to the ration at this period. The fact that cows will often leave rank grass for a feed of sweet hay goes far to prove that their system requires something of this sort, just as a man who had subsisted for a length of time on fruit alone would probably relish some dryer food, such as bread or biscuits.

The Treatment of Arable Land.

By G. N. Blackshaw, B.Sc., F.C.S., Government
Agricultural Chemist.

Articles have been published on the cultural treatment of arable land in previous issues of this *Journal*, but anyone who has studied the systems of husbandry practised in this and other parts of the world must have realised the necessity for constantly warning farmers, as far as possible, to guard against and so profit by errors which have been made in the past.

The maintenance of soil fertility is a matter of so much importance to the country in general, and to the agriculturist in particular, that no explanation is required for harping upon the same subject.

In this country we are fully alive to the fact that under present conditions the practice of a system of farming arable land which will maintain the fertility of the soil, or increase it, is fraught with some difficulty, for the reasons that the practice adopted in cropping land must naturally be guided to a very great extent by economic factors, by market conditions, and, in the case of the new settler, by the capital at his disposal.

A settler with limited capital taking up land so far from a populous centre as to preclude him from running a dairy farm has perforce to grow ready-money crops, crops for which there is an immediate market at remunerative prices. The amount of money he is able to allocate for the purchase of stock may, for some time, be small, consequently the growth of crops for the winter feeding of his stock will only be a small item. In such cases, then, the scope for the adoption of a rotation of crops, which is designed to fill the coffers of the farmer and protect him from rapidly impoverishing his land, is somewhat limited, but I will endeavour to shew later how he can protect himself more satisfactorily than has been done by some of the farmers of this country heretofore.

The reserve of available plant food in a virgin soil is naturally influenced by several factors. Many generations of plants have been collecting their toll of food from the soil and air, and although the subsequent decay of this vegetable matter has brought about the accumulation of available plant food in the surface soil, we are all aware of the fact that the fertility of virgin land is subject to great variation. In regard to the store of food material, the cause of much variation in virgin soils must be apparent, for it is dependent upon the composition of the rock from which the soil was originally formed, the quantity of decayed vegetable matter accumulated, the lie of the land, and the texture of the soil. That the rankness and decay of vegetation, supplemented perhaps by the available plant food carried by drainage and flood waters from the slope of the valley, has a great influence upon fertility is demonstrated by the fact that low-lying wet land, when drained, is much more fertile than the high land. Again, the frequent veld fires in this country have been responsible for the loss of much vegetable matter, the loss on this account being doubtless much more complete on the higher and dryer land than on the low-lying wet land. We can conclude, then, that the fertility level of newly broken virgin soil, which has for generations retained some of the organic matter resulting from the decay of the natural vegetation, is comparatively high. On such land the custom on the maize belts (to which attention is more particularly directed in this article) of this Territory has, generally speaking, been to practise continuous maize cultivation, and so long as this system of farming is followed, the grain sold direct and no purchased manures or foodstuffs brought on to the farm, the fertility level of the land will assuredly fall. Derelict farms in parts of the United States are examples of a comparable system of farming, viz., continuous wheat cultivation. On these abandoned farms the fertility was reduced to such an extent that the land could no longer be used for the profitable raising of crops, and such must inevitably be the result on every farm where similar methods are adopted.

It behoves us, therefore, to look into this matter very seriously and see if we can advance ways and means of overcoming the danger. It is true that there are valleys in parts of this Territory where the soil contains such an immense reserve of available plant food that it can, without manurial treatment, carry continuous crops of maize for many years without any sensible diminution in the crop returns, but such cases are exceptional, and even then the fertility level must gradually fall so long as the land remains in continuous cultivation. It is only a question of time; rich lands will naturally last longer without manure than those less fertile. In the United States, soil exhaustion has been studied by several soil investigators, and the conclusion arrived at is that on economic grounds not more than three or four grain crops should be taken in six consecutive years, and that the land for the other two or three years should be put under grass or a leguminous crop. The object of putting land under grass or leguminous crops at frequent intervals is to maintain an adequate supply of organic matter in the soil, and where nodule-bearing leguminous crops are grown there is the additional advantage that the land is cheaply replenished in nitrogen obtained from the air, this being the constituent of plant food in which soils become most rapidly deficient when kept under continuous cultivation, and the constituent of commercial fertilisers which, in this country, is the most costly. Where this system of crop rotation is adopted, the other available constituents of plant food in which soils are liable to be deficient, viz., phosphoric oxide, potash and lime, must be directly applied in the form of manures or fertilisers if such is found to be necessary.

In applying the sound principles of soil treatment laid down by the investigators referred to above, it has to be admitted by those conversant with the present local conditions—market and otherwise—that we are faced with some difficulty, nevertheless it is incumbent upon us to ascertain whether, under our circumstances, we can improve upon present methods, and approach more nearly the ideal.

It has been demonstrated by careful manurial trials carried out on red land at the Government Experiment Farm, Gwebi, that fertilisers, if judiciously used, can be applied with profit to the maize crop. It is unnecessary here to dilate upon those experiments, which have now been conducted over a period of four years, as full reports thereon have already been published in the pages of this *Journal*. Largely as a result of those trials, fertilisers are now made use of by maize growers, and the fact that the consumption of maize fertiliser is rapidly increasing year by year clearly proves that the deductions drawn from those experiments have been amply corroborated on private farms. The use of fertiliser is a distinct step in advance of the old system of pioneer farming; but it is possible that by the use of certain auxiliary crops we can in time to come reduce the fertiliser bill and still keep the land in good heart. Apart from the consideration of the maintenance of soil fertility, other advantages are to be derived from the growth of subsidiary crops in rotation with maize, the more important being that the labour requirements will be lessened as the planting and reaping seasons are spread over a larger period, and some control is exercised over insect and fungoid pests.

A list of some of the more important auxiliary crops enumerated by the Government Agriculturist is as follows:—Ground nuts, bean varieties, cowpeas (for grain or hay), potatoes, sweet potatoes, summer oats, summer wheat, linseed, pumpkin, melon, and hay crops such as teff, velvet beans, Boer manna and Japanese millet. Particulars can be obtained regarding these crops from articles which have been published in this *Journal*, or direct from the Government Agriculturist. Many of them are suitable for the lighter types of maize land, the careful management of which is so necessary if the level of production is not to diminish very rapidly.

As already stated, nodule-bearing leguminous crops such as ground nuts and cowpeas act as soil renovators, and evidence of this fact upon the succeeding crop has frequently been noted. Again, the effect of a grass crop, such as teff, as against continuous maize growing, upon the physical condition of the land is very marked. After teff it is a matter of common observation that the land can be broken down to a first rate tilth with much greater ease, as such a crop leaves behind a mass of fibrous roots which enrich the soil in vegetable matter, the rapid loss of which, under continuous maize cultivation, has such a harmful effect upon the physical condition of land, and its water holding capacity. The preservation of an adequate supply of organic matter or decayed vegetable matter in arable land, whereby it can be kept amenable to cultivation, and its power to conserve water and withstand occasional spells of dry weather maintained or increased, is a matter of great importance, and must not be overlooked. Commercial fertilisers and the advance that has been made in their use in recent years have already been referred to, but there is one point which must be remembered, namely, that fertilisers do not replenish the soil in organic matter; consequently, in the care of arable soils which do not contain abundance of this constituent some means must periodically be taken to maintain its supply. The application of kraal manure would, of course, meet the case, but the amount of kraal manure produced on most farms in this Territory is generally only sufficient to dress a very small acreage. Where crop rotation can be practised stubbles can be ploughed in, and the rate at which organic matter is lost will be checked. The frequency with which farmers can put their arable land under hay and leguminous crops must naturally vary to a very great extent, the outlet for auxiliary crops depending upon considerations of farm requirements for stock feed and the opportunity for the direct sale of such crops on the local markets. The local demand for what we have regarded as small crops must gradually improve as the country makes progress. The market for ground nuts in this Territory, for example, has hitherto been practically confined to the mines, but with the establishment of the B.S.A. Company's oil factory during the present year, the outlet for this crop will be greatly extended, and so doubtless the opportunity for putting in a more extensive acreage of other crops which are suited to the country, but for which the present outlet is small, must in time be provided.

The frequency with which maize land can be given a change of crop depends so much upon the outlet for making use of the produce that each farmer has to decide for himself what system of rotation he can practise, but he has never to lose sight of the fact that he must provide some means of maintaining the supply of organic matter if the fertility of the soil is to be preserved.

Where little scope is given for adopting a suitable system of rotation crops, land which is becoming deficient in vegetable humus should be put under a crop such as cowpeas, and the green stuff ploughed in. The cowpea is quoted as an example, because it is a nodule-bearing legume, and so enriches the soil in nitrogen as well as organic matter.

The tendency of many farmers is to put a larger acreage under crop than can be properly handled, but it is to my mind a far sounder policy to crop only such an acreage as can be given thorough cultural treatment, and to put the balance each year under a suitable green manuring crop for ploughing under. To rest land by bare fallowing is a mistake.

Summarising very briefly the foregoing:—The provision of an adequate supply of organic matter, as well as the judicious application of available plant food in the form of commercial fertiliser, are the means which must be put into practice if the fertility of arable land is to be maintained or increased.

Wanted.

The following numbers and indices of the *Rhodesia Agricultural Journal* are out of print and have been enquired for by readers:—

Vol. 1, Nos. 2 to 6.
Vol. 2, Nos. 1 to 3.
Vol. 3, Nos. 1 and 6.
Vol. 4, Nos. 1 and 4.
Vol. 5, Nos. 2 and 6.
Vol. 6, No. 2.
Indices to Volumes 1, 2, 3 and 5.

If any of our readers have any of these *Journals* and indices in their possession and do not require them, we shall be very pleased if they would kindly send same to us. If it is desired, they can be exchanged with any they have missing, if available.

Citrus Fruits in Rhodesia.

By A. G. Turner, Citrus Expert.

Budded orange trees should be three years from seed to time of transplanting into orchard, and probably the most suitable stock for this country will be, as proved in the Transvaal, Natal and Cape Colony, the rough lemon, as this stock is the most resistant to collar rot, and therefore the safest for the average planter to make use of. Practically all orange trees sold by reputable nurserymen in South Africa are on rough lemon stock.

We may consider that practically all citrus plantings in this Territory will be with a view to exporting the fruit overseas; therefore, it is advisable to plant only those varieties most acceptable for this purpose. With regard to the most suitable kinds of oranges to plant in Rhodesia, it is to be regretted that there is, at the present time, really no satisfactory data on which to work, but I consider it is safe to go by Transvaal experience, the climate and general conditions of which colony are very similar to Southern Rhodesia.

The most favoured varieties planted in the Union of South Africa for export are:—(1) Washington Navel, (2) Valentia Late, (3) Jaffa, (4) Du Roi, (5) Paper Rind St. Michael, (6) suitable seedlings. The first two kinds are undoubtedly the prime favourites.

Washington Navel is the most popular orange in the world, and always commands top prices wherever put up for sale, and there seems no reason to expect its losing its place as the best money getter, early to mid-season. It is seedless where properly grown.

The Valentia Late is not quite seedless, but it should contain only a few seeds. It is a late variety, and bears good medium large rather oblong fruit.

Jaffa is another orange containing few seeds, borne on an almost thornless tree, of large size, medium to late season.

The Paper Rind St. Michael orange has few seeds and a very thin skin; it is of good quality, but small; medium season.

Du Roi is a very heavy cropper, and will hang on the trees equally as long as Valentia Late. It is inclined to be light coloured, and has few seeds.

Seedlings, *i.e.*, trees propagated by budding from seedling trees, the fruits of which have shewn some particular merit.

The object of the planter for export should be to be represented by the best varieties over the whole period of the export season, which will be roughly June, July, August and September.

With regard to planting seedling oranges from seeds, this practice is not advisable. Some seedling trees produce excellent fruit, but one cannot depend on the result of planting seedlings, as the fruit may prove quite worthless for export purposes, although grown from seed taken from particularly fine fruit; moreover, they take longer than a grafted tree to come into bearing, and require more space in which to grow. They are also more expensive to handle in every way; in picking, spraying, fumigating, etc., as the tree grows to an immense height, whereas a budded tree can be kept comparatively low and easy of access for all purposes.

A budded orange tree, with proper attention, will commence to produce fruit in the third year from transplanting, but in no appreciable quantity. One should not expect much return until the fifth year.

It would be as well to warn planters that in purchasing young trees it is always advisable to buy the best obtainable. This is more particularly the case with the Washington Navel, as unless this variety is propagated from a reliable strain, it may be found when the trees come into bearing that trees have been planted which, as far as this variety goes, are practically worthless. A Washington Navel, unless true to type, loses at least half its commercial value. Therefore, do not buy any old thing that is called an orange tree of any particular name, but place your orders with firms who cannot afford to lose their names.

It might be useful here to give the estimated returns from Washington Navel, Valentia Late and seedling oranges at various ages:—

WASHINGTON NAVEL ORANGES.

5 yrs. old—1 box value in London 18s. per box gross sales.
6 yrs. old—2 boxes value in London 18s. per box gross sales.
8 yrs. old—4 boxes value in London 18s. per box gross sales.
10 yrs. old—6 boxes value in London 18s. per box gross sales.
12 yrs. old—8 boxes value in London 18s. per box gross sales.

Valentia Late oranges give the same yield per tree and the same value, but quotations are given for older trees.

15 years old—8 to 10 boxes.
20 years old—12 to 14 boxes.

SEEDLING ORANGES.

7 yrs. old—1 box value in London 12s. per box.
10 yrs. old—3 boxes value in London 12s. per box.
15 yrs. old—8 to 10 boxes value in London 12s. per box.
20 yrs. old—12 to 14 boxes value in London 12s. per box.

It will be seen from the above figures that the seedling does not commence to be profitable until the 7th or 8th year, while the budded tree yields a fair return in the 5th year; and also that the average value of seedlings is considerably lower than the others. Further, it must be borne in mind that these figures only represent the returns from the *very best seedlings;* the ordinary seedling would hardly pay its freight, etc., for exporting.

The approximate cost of exporting to England will be 5s. per standard box, which includes cost of box, railage, sea freight, insurance, landing charges and agent's commission.

One great point in favour of citrus fruits from Rhodesia, and South Africa generally, is that they ripen during a part of the year when the European and American markets are bare of this class of fruit. Of course a great deal—in fact everything—depends on the grower himself, as to the yield per acre and per tree.

A very general mistake throughout Southern Rhodesia, as far as I have seen, seems to be the idea that to obtain low-headed trees, all growth should be left low down on the stem. This is quite wrong, and such treatment will give a weak, straggling tree. To secure ideal low-headed trees, they must be cut back at planting to about 24 inches of trunk, from which three or four buds at the top, say in the last 6 inches, should be allowed to develop in branches, which will be the foundation of the future tree—nothing else should be allowed to grow. These three or four limbs are the leaders on which to continue building; consequently all the sap should be directed towards this framework and not allowed to run to waste in water shoots and otherwise redundant growth or suckers. Constant watchfulness should be maintained for adventitious shoots starting out on the stem or limbs at points where branches are not desired or required. Wherever they start out strongly, they should be pinched off, or, better still, entirely removed with a sharp knife. Suckers should also be removed at once, whenever discovered. From such grown trees, fruit is more easily and economically gathered than from those of such height that long ladders are essential, and, moreover, they are less liable to damage by high winds which are so prevalent in this country during the winter months, while the expense of spraying, fumigating, pruning and general work around the tree is lessened considerably by heading the tree low.

(To be continued.)

The Calf Pen on a Dairy Farm.

By R. C. Simmons, Chief of the Animal Industries Branch.

The present wet season has, in many instances, served to demonstrate only too clearly the necessity for good dry shedding for calves, unless, as is the case on ranches, the calves run with their dams, and the cattle are left free to fend for themselves. Many owners do not appear to quite realise that in order to run cattle successfully, one must do one of two things: either leave them practically full liberty to seek provision for their requirements from nature, or supply these requirements by artificial means.

Now, although, as the writer has seen, native cattle in kraals will sometimes be found standing knee deep in mud at night when dry ground is available, cattle running at large in camps will almost invariably select dry and sheltered spots to rest or sleep in, especially when they have young. Obviously, then, cattle appreciate comfort and a dry bed, and it is no wonder that they do not thrive over-well when they (especially the calves) are made to lie in a cold draughty shed in winter, or to spend their summer nights in wet unwholesome pens without bedding or warmth, and the healthy huddled together with the sick, as is very often the case.

In many instances one is aware that the fault lies with the farmer's bank balance rather than with himself: at the same time, with the exercise of a little forethought, much better accommodation could be provided at a small cost, which would pay for itself over and over again in the greater percentage and better quality of the calves raised. The writer cannot too strongly urge dairymen and stud breeders who have not made adequate provision for their young stock to give this matter their earnest attention between now and the beginning of winter, and to arrange for the necessary bedding, hay, green forage and so on, in order that during the winter their calves may sleep warm and full, and in the wet season they may not have to spend their days paddling up to their hocks in water, and their nights in sheds which have the characteristics of an underground dungeon.

Young calves do not require a great deal of exercise; in fact, at first, the less they have outside a moderate sized airy pen the better. They are better, however, running the flesh off their bones with their dams than lying in wet, bad pens. A good wholesome pen will obviate the necessity for either evil, as the calves can remain in it and thrive.

The form of calf shed which appears to be most satisfactory for this country is of the lean-to type, open in front and of the following dimensions:—

Height of back wall—Not less than 9 feet, with plenty of openings along the top for ventilation.

Depth from back to front—Not less than 14 or more than 18 feet.

Height of pillars or poles supporting front of roof—7 feet 6 inches.

Length—According to the number of calves it is required to house, 2 feet for each calf of all ages up to 6 months, with a minimum length of 10 feet.

The material may be brick and iron, all iron with thatch on top, or brick and thatch, as may be most available. If an iron roof is used, the ordinary slanting form is suitable, but with thatch, either temporary or permanent, it will be found advisable to adopt the gable form, in order to get the necessary pitch. The front should be closed with rails only about 4 feet high, and should face the opposite way to the prevalent wind. Cement or brick floors are not very satisfactory, even apart from the question of cost, and, provided plenty of good bedding is used, it will be found that a properly made macadamised floor will be as useful as any.

A good, dry, well-drained site should be chosen, and if it happens to be gravelly soil, little difficulty about the floor will be experienced. When there is any depth of soil, either of diorite or granite origin, some extra care must be taken to avoid the seepage of water under the walls from outside, which will render the floor damp and unwholesome.

In such a case the writer would recommend removing the earth to a depth of a foot or eighteen inches over the whole site of the building, and for about six feet all round in addition, before commencing to build. The space should then be filled in with stones and gravel, leaving the smaller stuff on top just as if one were making a road, taking care that the whole area is slightly raised above the surrounding ground, and made to drain from the back and end walls outwards and from the inside of the back wall right out to the front. The building can then be erected on this, using it more or less as foundation.

With such a shed the smaller calves may be kept in entirely until they are about a month old, and after that, up to six months, they may be allowed an hour or two daily exercise on short grass when the weather is favourable. If the weather is bad, they are better inside. A supply of sweet hay will be relished from an early stage, and, as they get older, a little green forage, mealie meal, bran, bean meal, pea meal or something of that sort must be added to the daily ration. The great thing to look to is a plentiful supply of clean dry bedding. If any calf is sick from scour or other causes, it should be removed to a separate sick pen, and the bedding, etc., where it has been lying should be destroyed. It is a wise plan to clean out the calf pen entirely once a month or so, and to lime-wash it or sprinkle it with some disinfectant, such as Jeyes' fluid. The dung should never be allowed to accumulate, but all soiled bedding should be removed daily and replaced with clean. Careful and regular spraying or dipping must be practised, in order to obtain the best results.

Agricultural Co-operation.

By E. Wilson.

What is co-operation? It is best defined as self-help by mutual help. It is a combination of interests to effect economies in trade or industry. Amongst its objects are:—the elimination of middleman's profits; the organisation of facilities for marketing produce; the purchasing in bulk of necessary farmers' requirements; the regulation of supplies and quality; in short, it enables farmers to control their own buying and selling. Under modern conditions, combination is as necessary to the farming industry as to any other.

Many traders combine farming with trading. If it be wrong for a combination of farmers to trade, is it right for traders to use the money they made out of farming by trade to compete with them in farming? Mr. Russell, in addressing an American Commission of Agriculture, said:—"Unless you are determined to eliminate the middleman in agriculture, you will fail to effect anything worth while attempting. No doubt he will rage furiously. He will organise all his forces to keep the farmer in subjection; and to retain his peculiar function of fleecing the farmer as producer, and the general public as consumers. It is difficult to start any movement for the benefit of any section of the community from which the interests of others may not suffer. Thus:—A temperance campaign does not appeal to the goodwill of the publican. The only section to suffer would be the middleman; but, if the result of co-operation means increased prices to farmers for their produce, the whole community benefits. Money is not made to hoard, but to spend, and the farmer is not slow in spending it."

An American advocate says:—"The success of the individual farmer in America has passed, and co-operation is a necessity, and if farmers are ever to enjoy prosperity and returns proportionate with their deserts they must win true co-operation." We live in an age which forbids us to stand still; we must keep moving forward or we shall be left hopelessly behind.

The arrival of the era of quick and cheap transport was the forerunner of co-operation. Previously the consumer was practically obliged to take farmers' produce—when he could get it—in various forms and many qualities. The advent of quick and cheap transport opened up new markets—the world's markets—to the virgin lands of the new world. The farmers of the old world were threatened with ruin. Those of Denmark, France, Germany and Western Europe were the first to seriously cope with the position, and in doing so tremendously improved their own. Steam, electricity and methods of refrigeration entirely altered the position of the farmer. The foreigner began to study the requirements of the English market. He soon realised that what the market required was a regular supply and uniform quality. He quickly recognised that neither requirement could be met in any other way than by co-operation; and he very soon adopted this method of conducting business, with the result that the industry in Great Britain was nearly ruined; and it was not until the position was taken in hand by one or two disciples of co-operation that the Home producer began to recover lost ground. As a slight instance of the tremendous strides co-operation has made in Ireland, it is pointed out that the value of the cream, butter, bacon and eggs produced in that country annually is greater than that of the shipbuilding and linen industries.

In 1894 the Irish Agricultural Organisation Society was formed with the object of advocating co-operation amongst farmers, giving advice as to formation of societies, and helping to guide them in many ways. In 1901 a similar organisation was created in England, and later, one in Scotland. These organisation societies do no trade and make no profit. They are supported mainly by voluntary contributions, but in addition receive monetary grants from the Board of Agriculture and the development fund in aid of their work in the promotion of co-operation. The societies which are formed by these organisations are entirely self-supporting and self-governed. They become affiliated to the organisation by payment of a small subscription, which entitles them to many benefits. They have the whole of the knowledge and experience of the central body at their disposal, are advised in matters of policy, and are helped in various ways.

It might be said that the State should undertake the organisation of such societies, but there is nothing to warrant the assumption that the State could do it better than the farmers themselves, and it would be impossible to relieve it from the responsibility of failure through adoption of its advice. The object should be to throw the weight of responsibility on the farmers themselves, for this provides an effective guarantee of the activity necessary to success; and State organisation would kill all voluntary effort. The experience of other countries has shewn that the State can do a great deal for agricultural co-operation, but only on the condition that it encourages and does not undermine the policy of self-help and initiative. In addition to the financial benefits, these organisations claim to have created better farming and better business methods.

In Ireland to-day there are approximately 1,000 societies, with a membership of 100,000, and an annual turnover of about £3,000,000. In England there are 560 societies, with a membership of 50,000, and an annual turnover of £2,250,000. But it is in countries such as Holland where we find agricultural co-operation at its best. Indeed it is practically impossible to find any branch of the industry that is not conducted on these lines. Through this co-operation of many small men, the Netherlands agricultural industry, with its greater intensity as compared with extensive farming elsewhere, is quite able to hold its own, both as regards the purchase of its raw materials and the sale of its produce. There we find farmers' loan banks; mutual assurance associations for fire, hailstorm, accidents and cattle; breeding societies for acquiring sires; control societies for testing milk, cream and cheese; creameries; cheese factories; bacon, eggs, milling, beet sugar, potato flour, cardboard, fruit, vegetable, and forwarding societies, etc., etc.

In California most of the citrus, raisin, walnut and fruit canning industries are conducted on co-operative principles.

Co-operation in agriculture may be applied in a great variety of ways, but one thing at a time is a fairly sound rule in organising work. It is best to select one line in which to make a start; other developments will follow if the first undertaking is successfully carried out. It is better to have several societies, each dealing with a separate line of business, than one society attempting to deal with many. Such a society would tend to become too cumbersome, and might end in failure. Two instances of successful methods will suffice as illustrations, viz.:—

A number of dairy farmers in a certain district of Holland form themselves into a co-operative association and establish a creamery for joint account. They bind themselves to deliver all their milk, for a definite time, to the creamery. The responsibility for debts and liabilities may be limited or unlimited, according to the articles of association. The necessary capital may either be subscribed by members or borrowed. They elect a board of directors from amongst themselves and appoint an expert to act as manager. The proceeds of the sale of produce—after deduction of working expenses and provision for the repayment of borrowed capital, if any—are divided amongst the members in proportion to the raw material delivered by each. The majority of such associations are combined in provincial associations. These in their turn form one federation for the whole of Holland. This federation looks after the general interests of the societies, supplies all the requirements of the dairy industry, and disposes of all the produce of the societies. It has agents abroad who furnish reports with regard to the standing of particular firms; it grants certificates of qualification for various positions in the creameries; runs a superannuation fund, and issues a weekly paper. It also organises local butter competitions, and exhibits at foreign exhibitions. It has created the organisation of two export societies, one of which has its agents in several cities in Great Britain, and a turnover of £500,000 a year. It employs qualified chemists and inspectors.

The associated creameries—of which there are 770—are inspected at regular intervals by officers of the federation. On all butter the Government mark is placed. This mark is printed on extremely thin, perforated paper, and placed on the butter in such a manner that it cannot be removed intact, and thus used illegally. The letters and figures on the Government mark are of such a nature that it is easy to trace the origin and time of manufacture of each parcel of butter. The total quantity of butter manufactured under control amounts to 120,000,000 lbs. per annum. The expenses of the federation are borne by the affiliated societies in *pro rata* shares.

The California Fruit Growers' Exchange is run on similar lines, but with slight variations. Thus we have the local associations, consisting of a number of growers, contiguously situated, who unite for preparing their fruit for market on a co-operative basis. They establish their own brands; make such rules as they may agree upon for grading, packing and pooling their fruit; and usually they own thoroughly equipped packing houses. Each grower's fruit is separated into different grades, according to quality, and goes into the common pool; and in due time takes its percentage of the returns according to grade. Any given brand is the exclusive property of the association using it, and the fruit of this brand is always packed in the same locality, and therefore of uniform quality. This is of great advantage in marketing, as the trade soon learns that the pack is reliable. There are eighty associations, covering every citrus fruit district in California. The several associations in a locality unite to form the local exchange, which serves as a medium, and to a certain extent as a buffer between the associations and the general exchange. Questions of purely local interest, and many real or supposed grievances, are disposed of in the local exchange, and through it more important matters reach the general exchange. The general exchange consists of thirteen directors, one each appointed by the local exchanges. By this method the policy and governing power of the organisation remains in the hands of the local exchanges.

This is the organisation: now for its methods of operation. Seeking to free itself from the shifting influences of speculative trading, by taking the business out of the hands of middlemen at home, the exchange found it quite as important to maintain the control of its own affairs in the markets. For this purpose the exchange established a system of exclusive agencies in all the principal cities, employing as agents active, capable men of experience in the fruit business. Most of these agents are salaried, and have no other business of any kind; nor do they handle any other fruit than that of members. Over all these agents are two general or travelling agents, with authority to supervise and check the various offices. These general agents maintain a complete bureau of information, through which all agents receive every day detailed information as to sales of exchange fruit in other markets the previous day. Possessing these data, the agent cannot be taken advantage of as to prices. If any agent finds his market sluggish, and is unable to sell at the average price prevailing elsewhere, he promptly advises the head office, and sufficient fruit is diverted from his market to relieve it, and restore prices to a normal level. Through these agencies of its own the exchange is able to get and transmit to its members the most trustworthy information regarding market conditions, visible supplies, etc. The system affords a maximum of good service at a minimum cost. The volume of the business is so large that a most thorough equipment is maintained at much less cost to growers than any other selling agency can offer. From top to bottom the organisation is planned, dominated, and in general detail controlled absolutely by fruit growers, and for the common good of all members. The total working costs of this organisation for the season 1912-13 worked out at 2⅜ per cent. on gross sales.

(*To be continued.*)

Exchange and Mart.

T. Sloan, Igudu, Marandellas, wishes to exchange a bull. Has too many breaking up ploughs and cultivators (in perfect order). Can an exchange be effected?

Some Injurious Caterpillars.

By Rupert W. Jack, F.E.S., Government Entomologist.

The Swarming Caterpillar (*Laphygma exempta*).—This is the Rhodesian "army worm," the latter name having been given in the United States of America to caterpillars which periodically attain to great abundance, and having finished the food supply in one region, advance in a swarm to new feeding grounds.

The present species, which is a native to Africa, only occasionally thrusts itself into notice. It was exceedingly abundant in the early part of 1910, and did a great amount of damage to native crops in the Umtali and neighbouring districts, and it was also very abundant about Salisbury and even in the township itself, receiving notice in the Press from its attacks on the lawn of the Town House. From that year until 1914 not even solitary specimens were met with, and no complaints of any injury were received, but in April, 1914, the pest put in an appearance in an outdoor breeding cage at the Experiment Station, Salisbury, which contained grass and potatoes, and after finishing the grass, attacked and defoliated the potato plants. During December of the same year complaints of severe injury to young maize were received from farms in the Hartley, Mazoe and Makoni districts. In these reports several hundreds of acres of young maize were in certain instances stated to have been demolished, and the damage was, therefore, quite considerable.

The caterpillar (Plate I., Figs. 2, 3, and 7) attains a length of about one and one-fifth inches, and is dark in appearance, so that a casual observer generally describes is as black. The back is a very dark green in colour with a lighter narrow median line, which, on closer inspection, is seen to consist of three closely apposed thin light lines. Two thin light lines border the dark dorsal strip on either side, and beyond this is a broader light strip consisting of dark green stippled with light greenish yellow. A narrow dark strip runs along the region of the spiracles, which are white. The under part of the body and the legs are light yellowish green. The head is black with a narrow white line marking the edge of the eyes where they border the face. Unlike the following species, the caterpillars appear to vary but little.

The moths, two of which are figured at their natural size at Fig. 1 on Plate I., are somewhat variable, some specimens being much darker than others, but their general appearance will be seen from the photograph. They are brownish in colour with white underwings and are of nocturnal habit, with little to distinguish them from a host of related species.

The life history of this species has not been closely followed, but it is doubtless very similar to that of the next species. The eggs are laid in clumps of about 60 on the food plant, and are lightly covered with down from the body of the mother. The caterpillars feed up rapidly, attaining their full growth in a few weeks. The full-grown caterpillar enters the soil and there in a flimsy cell of earth changes to a brown pupa (chrysalis) from which the moth emerges in between a fortnight and three weeks, and proceeds to lay eggs for the next brood. The broods seem to be more marked than in the case of the next species, the caterpillars attaining maturity more or less about the same time. This has at least been the case in those outbreaks which have come under notice.

The natural food plants of the species are grasses of various sorts, and this is the reason that the species is not usually in evidence except when it swarms from the veld on to cultivated lands. It has been recorded as injurious to maize, kaffir corn, kaffir millet (rapoko), oats, barley and wheat. During favourable years the moths actually lay their eggs on such crops as well as the surrounding grass. When hard pressed it will attack other crops, as in the case of the potato plants at the Experiment Station, but this is exceptional.

The rise and fall in numbers of an insect pest is a phenomenon that may well excite speculation in the mind of anyone who happens to think about it. Why should a species of caterpillar destroy several hundred acres of maize on a farm one year and then apparently disappear entirely for the next

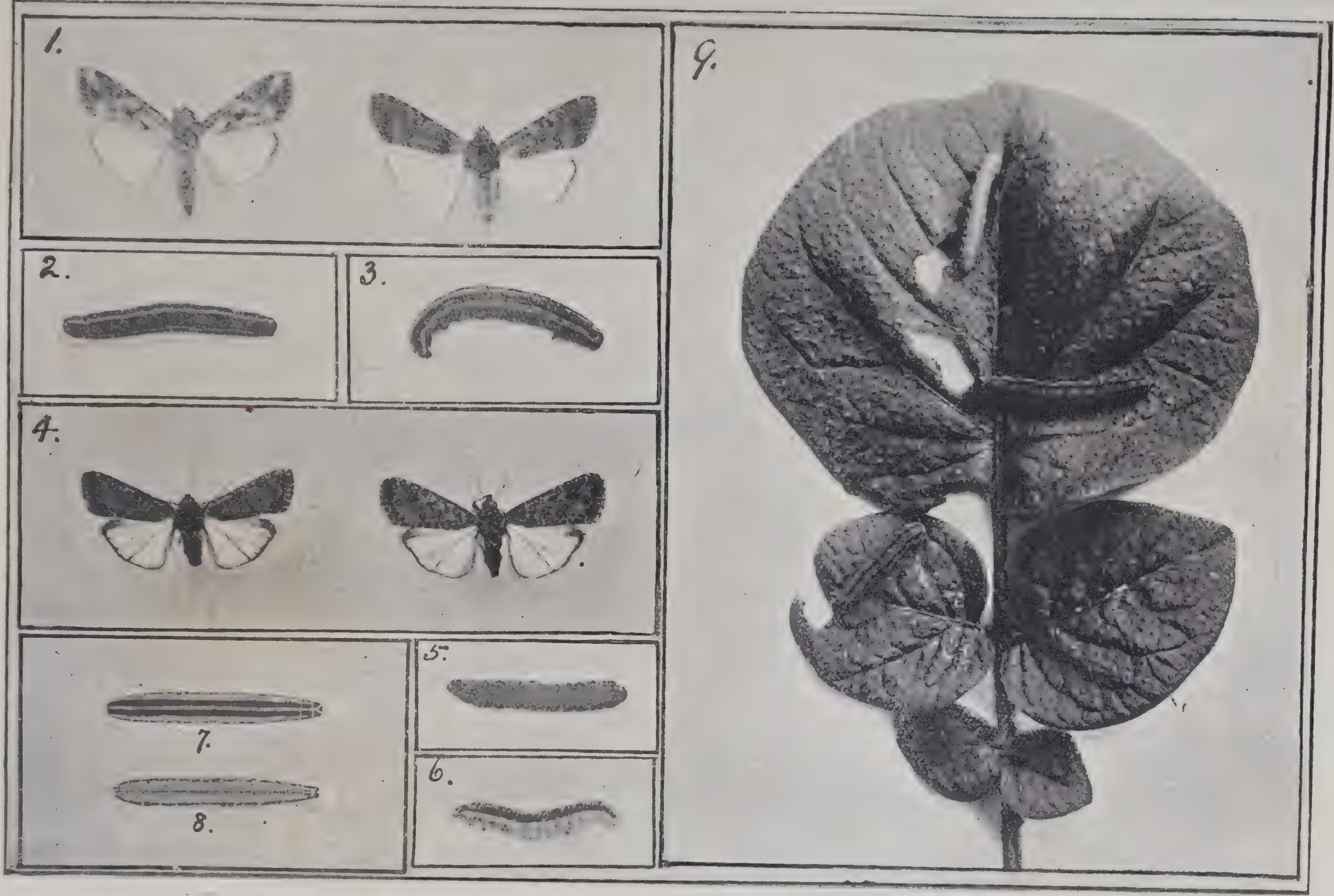


Plate I.

five years or so? Also, why should an insect which we know breeds prolifically and matures in a few weeks be extremely abundant and destructive in December and not necessarily a still greater pest the following February, when the caterpillars of the next generation are feeding up? The exact causes that lead to seasons of great abundance of such insects as the one under consideration cannot be explained in detail, as they are only imperfectly understood, but they can be summed up as the concurrence of a number of factors favourable to the pest. As nearly everyone knows, insects are subject to the attacks of enemies and disease, which act as a check on too great increase, and usually serve to keep the species within limits. Factors unfavourable to the checks favour the pest and allow it to become unduly numerous for a time, until with the return of favourable conditions the checks once again obtain the upper hand.

Under normal circumstances the most active checks on caterpillars are parasites and insectivorous birds and insects. A parasite fly belonging to the family Tachinidæ has been bred from the Swarming Caterpillar, but not in great numbers. A fly of this family is shewn at Fig. 6 on Plate II. These flies lay their eggs on the skin of the caterpillar, and the fly maggot when hatched makes its way through the skin and feeds until full-grown on the tissues of its host, which eventually succumbs, although it may have sufficient strength to change to a pupa before death. Small parasitic wasps play a similar part. Next to these, insectivorous birds are most important.

When the insect is abundant enough to "swarm," however, the Great Locust Bird or White Stork (*Ciconia alba*) generally puts in an appearance and causes a great reduction. Disease often attacks the caterpillars when over-numerous, and quickly decimates their numbers.

Remedies.—Crops may be protected from these caterpillars if the invading movement is noted early enough, but the action of the pest is so rapid that the promptest measures are necessary. If a few maize plants near the edge of the land next the grass are noticed to be eaten, an inspection should be made to ascertain whether or not an invasion by this pest is commencing, and if so, whence the caterpillars are advancing, and in what direction they are travelling. The grass between the swarm and the crop may then be sprayed with poisoned sugar solution, prepared as follows:—

Arsenite of soda—1 lb.
Black sugar or treacle—8 lbs.
Water—10 galls.

The arsenite should be dissolved in a little boiling water, as it dissolves very slowly in cold, and added to the sugar or treacle solution. A strip about 12 feet broad should be treated with the above. The caterpillars are exceedingly fond of sugar solution and die very quickly after assimilating the poison. Live stock must, of course, be kept off the treated veld.

As a rule, however, the invasion will not be noticed until a considerable portion of the land has been invaded and noticeable damage done. Efforts must then be directed to confining the pest to the invaded portion. For this purpose grass or other green stuff dipped in the above poison can be strewn freely around the infested zone, and if sufficient in quantity, will constitute an effective barrier against further spread. If the caterpillars are still advancing from the veld, steps can be taken to check them by spraying the grass as already described.

Where the caterpillars actually develop on the crop itself, practically nothing can be done if they are more or less evenly distributed, as maize and small cereals will not bear the cost of spraying. If an intense attack occurs in a limited portion of the land, however, it is to be feared that before attaining full growth the caterpillars may demolish the food on that portion, especially if the maize is young, and spread to other parts of the land. Under such circumstances it is worth while to spray the infested portion with arsenite of lime (see under "Pigweed Caterpillar"), adding 3 lbs. of black sugar or treacle to each 50 galls. of liquid.

THE PIGWEED CATERPILLAR (*Laphygma exigua*).—The name "Pigweed Caterpillar" was given to this pest by Mr. C. W. Howard in the Transvaal, who found it in great abundance on the pigweed (*Amaranthus paniculatus*). The name is of little significance in this Territory, but as it is undesirable to multiply popular names for insects, it is retained for the purposes of this paper. In the United States the insect, which

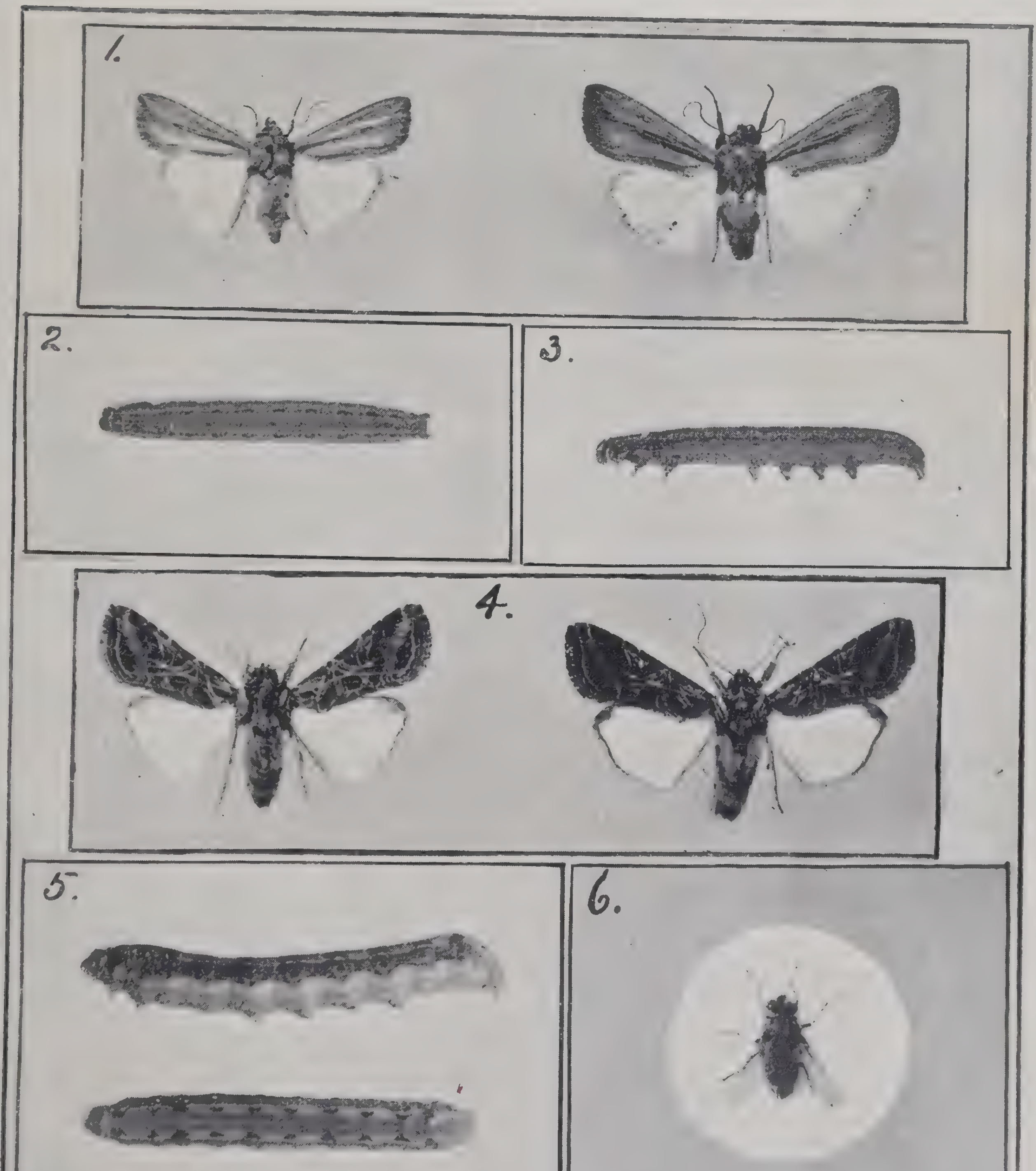


Plate II.

is almost cosmopolitan in its range, is known as the "Beet Army Worm."

This moth is closely related to the preceding, but being less restricted in regard to its food plants, is a far more familiar insect. A casual inspection of the experimental crops at the Experiment Station, Salisbury, during the wet season will almost always reveal this caterpillar in varying numbers, and occasionally it is sufficiently abundant to be seriously injurious.

The caterpillar reaches a length of rather over an inch, and is very variable in coloration. Some specimens are almost uniform green, the markings being nearly obliterated, whilst others are very dark owing to the markings being greatly intensified. Others again shew variegations along the dorsal stripe, which sometimes take the form of a succession of V-shaped markings, the open ends of the V's being towards the head. The commonest type is shewn at Figs. 6 and 8 on Plate 1. The general colour is green, the broad dorsal stripe being lighter than the lateral stripes. A narrow darker stripe usually runs down the middle of the back. The dark lateral stripes just embrace the spiracles, and below them on either side is a conspicuous yellow stripe, clearly shewn at Fig. 6. The under parts and legs are light green. A glance at Figs. 7 and 8 on Plate I. will shew that the markings of *L. exigua* are almost the converse of those of *L. exempta.* Apart from this, the present species is smaller and the head much narrower.

The adult moths (Plate I., Fig. 4) vary very little in coloration, though greatly in size. The fore wings are mottled with brown and bear two yellowish spots (stigmæ). The lower wings are pearly, with the veins and lower margins more or less suffused with brown.

The life history of this species has been followed in some detail at Salisbury. The eggs are laid in clumps containing from 30 to 100 eggs on the food plants, and are covered with down from the anal tuft of the female. This gives the clumps the appearance at first glance of fungus outgrowths on the plant, and helps to conceal their nature. The eggs hatch in about 4 days. The caterpillars feed up rapidly, and in about 18 days commence to pupate in a frail earthen cell in the soil.

The moths emerge from about 12 days later. From the time the eggs are laid to the appearance of the first adults may under exceptionally favourable conditions be as short as 29 days. The broods follow one another rapidly, but in the field they overlap considerably. This overlapping is due to unevenness in the growth of the larvæ, a very common occurrence amongst many-brooded caterpillars. For instance, from eggs which hatched on the 8th and 9th of December, larvæ, although subjected to exactly the same conditions, pupated in the cage from 30th December to 7th January, and on the latter date several larvæ still remained. From this lot moths emerged daily from 14th to 29th January, covering a period of 13 days. As the species develops very rapidly, this results in the broods becoming indistinguishable.

In America this species is credited with passing the winter as a moth. In Southern Rhodesia moths emerge at least until late in June, and eggs are laid as early as September. As July and August are months of great scarcity in regard to plant life in the Territory, the moths doubtless wait over until, with the advent of warmer weather, suitable food plants become available. This period comprises the months of July, August and the greater part of September.

The development of the insect is retarded by colder weather. The shortest pupal period recorded is 9 days, from 19th to 28th November, the hottest period of the year. From October to April the period is about 10 to 12 days. The longest period was from 4th to 28th May, namely, 24 days, the weather by this time being decidedly colder.

The food plants of the Pigweed Caterpillar are very varied: it is, in fact, a general feeder. In this Territory it has been found feeding on lucerne, potato, tobacco, swede, maize, spinach and mangold, as well as on indeterminate weeds. In the Transvaal, Howard found it on cotton, in addition to some of the plants mentioned. In the United States it is also reported to attack pea, apple, pear and onions. Sugar beet is, of course, a favourite food, and its attack on this crop gave the insect the American name of "Beet Army Worm." The caterpillar is wonderfully voracious, and having finished the foliage of tobacco plants in seed beds, has been seen to devour the stems first above the ground, and finally under-

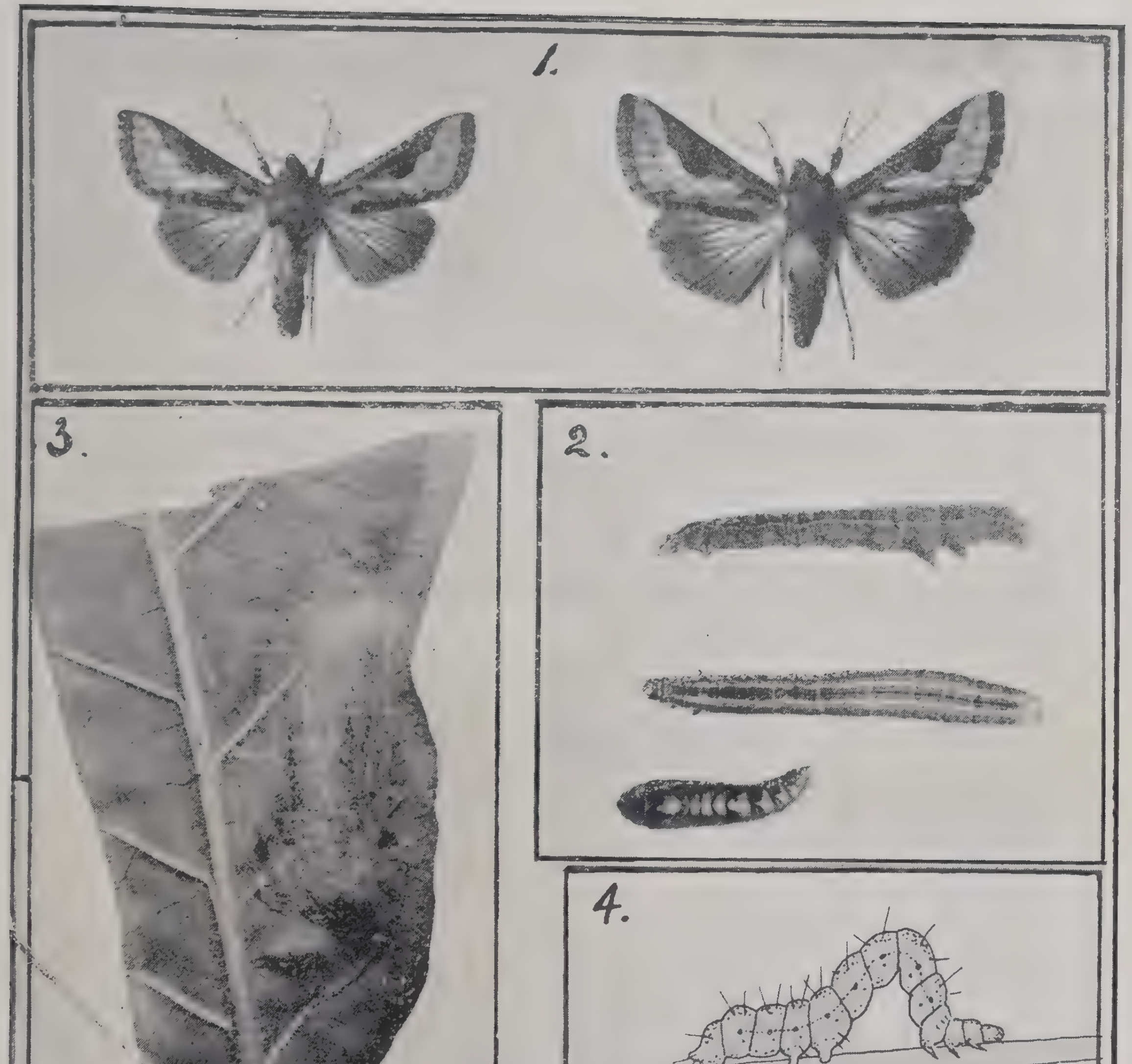


Plate III.

ground. On one occasion the larvæ were found feeding on some exposed potato tubers at the Experiment Station, Salisbury, eating well into the tubers. They completed their growth on this diet, and the moths emerged in due course.

As a pest in Southern Rhodesia, the species has been chiefly prominent in connection with early potatoes grown under irrigation in October, and mangolds in February and March. It is sometimes injurious to lucerne and tobacco.

Remedies.—On such crops as potatoes and mangolds the caterpillars may be easily controlled by spraying with an approved arsenical wash, such as arsenate of lead, arsenite of lime, or paris green. These washes are used in the following proportions:—

(1) Arsenate of lead—3 lbs.
Water—50 galls.

Mix and apply. The best but most expensive of the arsenical compounds.

(2) Arsenite of Lime—
Arsenite of soda (80 per cent.)—¼ lb.
Quick or fresh water-slaked lime—2 lbs.
Water—50 galls.

The arsenite of soda should be dissolved in a little boiling water, as it dissolves but slowly in cold, and made up to 25 galls. in one barrel. The lime should be slaked, if necessary, and mixed with 25 galls. water in another barrel. The lime water should be poured through a piece of cloth into the arsenite solution to strain out any grit that may be present. After mixing and stirring, the wash is ready for use. Arsenite of lime is formed by the combination of the two ingredients. 60 per cent. arsenite of soda is not suitable for making this wash, as it contains an excess of soda, which may burn the foliage. Prepared as above, it has been found that no burning occurs on the most tender leaves, and as the precipitate is very fine, this preparation is superior to paris green and but little inferior to arsenate of lead, whilst its cost is only a fraction of the latter.

(3) Paris green—1 lb.
Fresh lime—2 lbs.
Water—160 galls.

The lime is added to render insoluble the free arsenic which is always present in paris green, otherwise burning of the foliage will result. Paris green needs very thorough agitation during application, as the precipitate is heavy and settles very quickly.

When lucerne is attacked, a different procedure is necessary, as the foliage of the crop obviously cannot be sprayed with a poison. Mr. C. P. Lounsbury, Chief of the Division of Entomology at Pretoria, states that he has found green stuff dipped in poisoned sugar solution, as recommended in connection with the Swarming Caterpillar, effective against this pest on lucerne, if strewn between the rows.

THE MAIZE CATERPILLAR (*Cirphis loreyi*).—This caterpillar is not confined to maize as a diet, nor is it the only caterpillar which attacks this plant, but in this Territory it has only come into notice as a maize pest, and it is by far the most important leaf-eating caterpillar that feeds on the staple crop.

Like the preceding, this species is very widely distributed: in fact, in the British Isles the moth is known as the "Cosmopolitan." It does not appear, however, to have been recorded as a pest outside of Africa. This moth is closely related to the famous "Army Worm" (*Cirphis unipuncta*) of America and India, and is similar in its feeding habits, but it has not assumed the "army worm" tendency very decidedly in Southern Rhodesia during the past few years, although it has on occasions been very destructive in limited areas. It is likely, however, to exhibit the swarming habit during very favourable seasons.

The caterpillar attains a length of an inch and three-tenths. A specimen is shewn from the dorsal and lateral aspects at Figs. 2 and 3 on Plate II. The ground colour is a very light yellowish brown, with dark brown stripes and markings, which shew clearly in the plate. The eyes are rather remarkable. The ground colour is similar to that of the body, but rather more yellowish, and the surface is closely netted with dark brown, with a strongly marked brown stripe along each inner margin.

The moth is shewn at life size on Plate II., Fig. 1. The fore wings are pale straw colour, streaked with brown, and the hind wings pearly white. These moths are of nocturnal habit, like all the species dealt with in this paper, and lie up in snug retreats during the day.

The Maize Caterpillar lays its eggs in strings within the leaf sheaths of the maize plant, or within the leaf sheaths of the grasses, which constitute its natural food. On maize the caterpillar feeds normally on the young and tender leaves of the heart, and fouls the centre of the plant greatly with its excrement. Most of the feeding probably occurs at night, but many caterpillars may be found in the leaf sheath during the day. The larger proportion, however, seem to retreat to the foot of the plant by day and conceal themselves in the earth. When full-fed, the caterpillar pupates in the soil, the moths emerging in something over a fortnight. The life cycle is a short one, and a number of broods occur during the year.

The natural food plants of this species are certain wild grasses of the veld. Two species are greatly favoured, namely, *Eleusine indica* and *Setaria verticillata*, both of which occur commonly as weeds on the darker and richer soils commonly devoted to the cultivation of maize. All the cases of serious injury which have come to notice, and there were many in the early part of 1913, have obviously been the result of the sudden destruction by cultivation of grass which has been allowed to grow to a considerable extent in the maize land. The caterpillars were feeding on the grass in great numbers, and, being deprived of their natural food, attacked the maize and in many instances entirely demolished a considerable acreage of well-grown plants.

The moth breeds slowly through the winter, larvæ collected in June having produced adults in abundance in August, the intervening two months being passed in the pupal stage. When feeding on maize as late as June the caterpillars attack the cobs, feeding on the spathe, core and seed. They were found to feed on the latter after it had become quite hard and flinty.

Besides the above, oats and pea-nuts have been recorded as food plants at Salisbury, the latter being apparently little relished.

Prevention and Remedies.—The facts mentioned concerning the origin of the heavy attacks on maize that occurred in 1913, indicate that keeping the weeds down in the maize field from the commencement is the best method of avoiding attack. If the grass has been allowed to get ahead, an inspection should be made for caterpillars before cultivating. The caterpillars will be little in evidence during the day, and must be sought amongst rubbish and in the earth about the base of the grass plants. If present in dangerous quantities, there will be no difficulty in finding them, and it will be probably better to wait until their numbers have decreased by the caterpillars changing into pupæ before cultivating, as the weeds are likely to do less harm than the caterpillars. This will probably entail a delay of about 10 days. The moths that emerge from the pupæ will mostly migrate from the field if cleaned up meanwhile, to lay their eggs on the grass on the veld.

The damage from eggs laid on maize plants themselves is not usually sufficiently serious to call for remedial measures. When the caterpillar develops the "army worm" habit, remedies similar to those discussed under the "Swarming Caterpillar" are applicable.

TOMATO CATERPILLAR (*Prodenia litura*).—This name is given because the caterpillar was first found feeding in this Territory in great numbers on tomato plants, and as few insects feed on this plant, the name is not likely to cause confusion. *Prodenia litura*, as far as the writer is aware, has only been recorded as a pest in Africa and India, but closely related species are injurious in North America.

The large and strikingly marked caterpillar of this species (see Fig. 5, Plate II.) attains a length of an inch and five-eighths. The general colour of the larva is a dark greenish brown ornamented on the back with three narrow light lines and two rows of dark velvety spots, all of which are quite conspicuous on the plate. The colour shewn is very distinctive, so that the caterpillars are easily recognised.

The handsome moth is shewn at its natural size at Plate II., Fig. 5. The dark portions of the fore wings are a warm brown, the light streaks being straw coloured. Close to the base of the wing in typical specimens is a small grey blue area, and an irregular broad bar of the same colour extends from the tips of the wings to inside the hinder angle. The hind wings are pearly white.

The life cycle of this species has been followed in India, and the following notes are taken from "Some South Indian Insects," by T. Bainbrigge Fletcher. The eggs are laid in clusters on the leaves, and covered with buff coloured hairs derived from the body of the female moth. The eggs hatch after three or four days into small blackish green larvæ which live gregariously for a short time before dispersing. The larva is full-fed in about 20 days, and pupates in an earthen cell about two inches below the surface of the soil, the moth emerging after about six days. The whole life cycle occupies about one month in India, but it is unlikely that it is quite so short in this Territory.

The caterpillar is a general feeder, and its status is that of a sporadic garden pest. At Salisbury it has been found feeding on tomato, potato, pea, tobacco, maize (green cob), and some undetermined weeds. In India it has been recorded also on castor oil, lucerne, cabbage and grass, amongst other plants. When nearly full-fed, the caterpillar seems to rest during the day amongst rubbish, etc., beneath the plants it attacks, and to feed almost exclusively at night, but odd specimens may be seen on the foliage during dull weather.

Remedies.—The well-grown larvæ, when hiding beneath the food plant during the day, may be collected by hand in great numbers and destroyed. Plants badly infested with the young larvæ should be sprayed with one of the arsenicals detailed under the "Pigweed Caterpillar," or dusted, when the dew is on the foliage, with a mixture of 1 lb. paris green and 20 lbs. of lime. The powder may be held in a piece of sacking, through which it can be shaken over the plants.

THE TOBACCO BUDWORM (*Chloridea obsoleta*).—This insect is only important in Southern Rhodesia as an enemy of tobacco. It is, however, an almost cosmopolitan insect, and is exceedingly injurious to cotton where this crop is grown, whence in America it has received the popular name of the "Cotton Bollworm." Its attacks on the fruit of the tomato have earned it the name of the "Tomato Fruit Worm," but this habit does not seem to be greatly developed in this Territory. It is also known as the "Corn Earworm," from its habit of feeding on the silk of maize cobs.

The caterpillar reaches a length of about an inch and two-fifths. The prominent false legs and somewhat elongated form give it a very active appearance. The coloration is very variable, varying from pale apple green to dark green or reddish, and no general description will serve to distinguish the species easily. The form of the caterpillar may be seen by reference to Plate III., Figs. 6 and 7.

The moth is shewn at Fig. 5 on Plate III., and will be easily recognised from the photograph. The fore wings are pale greenish or pale russet, with darker markings of red brown or brown. The darker band towards the outer edge of the wings is often nearly wanting. The hind wings are of a dirty yellowish colour, with a broad smoky band along the outer margin.

The eggs of this moth are not laid in clumps like those of the preceding species, but are attached singly to the food plants. They hatch in from three to five days. The caterpillars reach maturity in from two to three weeks, and then usually enter the soil to pupate, the moths in the summer broods emerging some two weeks later. This is a moth, however, which does not breed into the winter, but passes this period in the pupal stage, the moths from the over-wintering brood emerging usually from the middle to the end of October. In some cases pupæ formed in March over-winter, but as a general rule larvæ are found as late as May.

As may be judged from the fact that the insect is a serious pest of cotton and tobacco, and a by no means negligible enemy of tomato and maize, the range of food plants is considerable. Besides the above, it has been found in this Territory feeding on linseed, on the green pods of dhal and cow-peas, and on ground nut. As a pest of tobacco, it has not been found in Southern Rhodesia, as it has elsewhere, feeding actually on the unopened buds, a habit which has given it the name "Budworm" in America. In the cases in which it has been injurious, it has been the young leaves of the centre of the plant that have been attacked, but it must be confessed that only one or two cases of injury have been personally investigated. The earliest attack on tobacco recorded was in December, the centre leaves of the very young plants being devoured. Moths from this brood emerge during the latter part of January, and give rise to a brood which injures the tobacco about the second week in February. This is usually the most injurious brood as far as tobacco is concerned. These caterpillars produce moths during the first half of March, and the caterpillar of the next brood may be in evidence towards the end of the month or early in April, but the broods by this time overlap considerably. As already mentioned, the last brood is full-fed in May and overwinters. These latter broods attack the seed capsules of tobacco and the silk of maize cobs, and are only responsible for minor damage as a rule.

Prevention and Remedies.—As the pupa passes the winter near the surface of the soil, the most practical suppressive measure is to plough deeply the land on which the last brood has fed—usually on the ears of maize—in June, and to harrow thoroughly so as to break up the pupal cells and expose the helpless pupæ to cold and their enemies. This treatment will reduce the numbers very greatly.

On tobacco this pest is usually controlled in the Territory by hand picking, but this is a laborious method, and the natives could be better employed elsewhere if poison were utilised instead. A practical method is to apply the mixture of dry paris green and lime, 1 lb. of the former to 20 lbs. of the latter, to the centre leaves of each plant from a tin perforated with holes, like a pepper canister. The operator walks along the rows and shakes a little of the poison on to the centre of each plant as he passes, and can cover the field very rapidly by this method.

THE BURNISHED BRASS MOTH (*Plusea orichalcea*).—The name of this moth alludes to the bright brassy patches on the fore wings of the adult, which distinguish it at a glance from all related species found in South Africa. The name was originally given to a very closely related species (*P. chrysitis*) common in the British Isles. *P. orichalcea* is very abundant in this Territory, and apt to be destructive in the kitchen garden and frequently in the field.

The caterpillar is of the "semi-looper" type, that is to say, the two front pairs of false legs are suppressed (see Plate III., Figs. 2 and 4), and the caterpillar is forced to progress by arching its back and bringing the hinder portions of its body forward so as to get a grip with its false legs near the true legs (in front), and then extending the body again to get a grip with the true legs further forward. In a certain family of moths three pairs of false legs are suppressed, and consequently this mode of progression is accentuated. These are termed "loopers," or "measuring worms." The caterpillar of the Burnished Brass Moth attains a maximum length of about an inch and a quarter, and is of slender form, tapering towards the head. The colour is bright green, with longitudinal stripes of dark green and white.

The life cycle has not been followed in Southern Rhodesia. The caterpillar feeds up rapidly, however, and there are certainly quite a number of broods during the year. Pupation takes place in a silk cocoon on the food plant (see Plate III., Fig. 3), the pupal stage lasting from 9 to 10 days during the warm weather. Adults are out, often in great abundance, throughout January, February, March and April. They are great frequenters of blossoms, about which they may be seen in numbers at dusk, and are also often attracted into lighted rooms.

The caterpillar is a general feeder on low-growing plants. It has been recorded in this Territory on lucerne, Egyptian clover, cowpea, maize, rape, radish, carrot, lettuce, linseed, potato and "black jack" (*Bidens pilosa*). The latter is a very favourite food of the caterpillar, which may be present in great numbers in weedy maize fields, and, after cultivation, rather reluctantly attacks the maize plants, for which it has apparently little liking.

Severe outbreaks are generally checked by the appearance of disease, which often kills off 90 per cent. Tachinid flies also play their part in checking this species, and the White Stork (or Great Locust Bird) will pay great attention to infested lands.

Remedies.—Spraying with one of the arsenical compounds already detailed is effective. To secure greater adhesence, it is sometimes advisable to add resin soap to the spray. This soap is prepared by boiling 2 lbs. powdered resin with 1 lb. washing soda in half a gallon of water until a clear solution is obtained. This quantity may be mixed with 25 gallons of the spraying fluid, and is most effective in conjunction with the preparations which contain lime. Plants of which the foliage is to be eaten should not be sprayed with arsenical poisons within, say, three weeks of the time they are to be eaten. If this precaution is observed, there is no danger in eating sprayed vegetables.

EXPLANATION OF PLATES.

Plate I. Fig. 1. Swarming Caterpillar (*Laphygma exempta*) —adults.
Fig. 2. Swarming Caterpillar—larva.
Fig. 3. Swarming Caterpillar—larva.
Fig. 4. Pigweed Caterpillar (*Laphygma exigua*)—adults.
Figs. 5 and 6. Pigweed Caterpillar—larvæ.
Fig. 7. Larva of *L. exempta*, shewing dorsal markings.
Fig. 8. Larva of *L. exigua*, shewing dorsal markings.
Fig. 9. Larvæ of *L. exigua* on potato foliage.

Plate II. Fig. 1. Maize Caterpillar (*Cirphis loreyi*)—adults.
Figs. 2 and 3. Maize Caterpillar—larvæ.
Fig. 4. Tomato Caterpillar (*Prodenia litura*)—adults.
Fig. 5. Tomato Caterpillar—larvæ.
Fig. 6. Parasitic Fly (*Tachinidæ*), bred from *Cirphis loreyi* larva.

Plate III. Fig. 1. Burnished Brass Moth (*Plusia orichalcea*) —adults.
Fig. 2. Burnished Brass Moth—larvæ and pupa.
Fig. 3. Cocoon on leaf.
Fig. 4. Diagram illustrating mode of progression of "semi-looper" larva.
Fig. 5. False Budworm (*Chloridea obsoleta*)—adult.
Figs. 6 and 7. False Budworm—larvæ.

Shangani Irrigation Dam.

By M. Randall, A.M.I.C.E., Irrigation Engineer,
Land Settlement Department.

As Rhodesia has just emerged from a most trying period of dry years, it is thought that the following notes may prove of interest to the growing ranks of agriculturists who realise the importance of irrigation.

The Shangani dam was designed to overcome certain conditions brought about by the drought, and to provide for the permanent irrigation of a total of 300 to 400 acres of arable land. The latter is made up of various areas of red, black and sandy soils, each possessing its own set of physical, chemical and mechanical properties. Thus the cultivation and irrigation of a wide range of crops is aimed at, amongst which, it is hoped, lucerne will form the chief product.

The dam is situated on the Pongo River, about two miles from its junction with the Shangani River and nine miles north of Shangani Station. To the dam there is a catchment area of 45 square miles, over which an assumed average annual rainfall of 20 inches has been adopted for data purposes. Allowing for a 5 per cent. run-off of the precipitation, 100 million cubic feet, or 625 million gallons, would be the total run-off in an average year. The storage capacity of the dam is from 120 to 160 million gallons.

The site chosen for the construction of the dam presents unique features for the abutment of an earthen embankment and the disposal of surplus waters. (See Fig. I.)

The latter is provided for by a concrete sill, 400 feet in length and of an average height of two feet: the discharge is carried off by means of a wasteway joining the river channel at a spot well below the downstream toe of the embankment.

Principal levels governing the works:—

Lower outlet pipe at level	0 feet
Top clay core at level	8 feet
Upper outlet pipe at level	10 feet
Top storage level or concrete sill at level ...	21 feet
Crest of embankment at level	25 feet

Thus there will be 21 feet of water over the lower outlet pipe, 11 feet over the upper, while the crest of embankment is 4 feet higher than sill crest.

It was decided to form the embankment from scraped material taken from the storage basin. This is composed of selected friable red alluvial, containing equal proportions of sand and clay. Only drag scrapers were used on the work. The material was tipped dry on the embankment in even shallow layers of about 9 inches in depth, such work resulting in a very hard compact surface always being maintained. Small scraper loads and frequent trips contributed largely towards the attainment of this object. Utmost care was taken to exclude all humus and vegetable matter from the seat of embankment and scraped areas. No scraping was allowed inside a line running parallel with the toe of the embankment and at a distance of 30 feet from it. A clay puddle core, as shewn in Fig. II., was provided and founded on solid rock or other impervious material, having its crest 8 feet above the lower outlet level, and running longitudinally throughout the whole length of the embankment.

Two 9 inch diameter steel outlet pipes were provided, and were trenched throughout their lengths in the solid. Concrete casing and staunching rings, as shewn in Fig. III., were placed in the trenches and around the pipes throughout their lengths. By these means it is hoped to prevent seepage, so common in earth embankments where the pipes are placed through the made up material and are left unprotected.

The water slope of the embankment is faced with hand packed pitching 9 inches deep, carefully rammed in place on selected material.

About 4,500 cubic yards of material were deposited on the embankment during a working month of 25 days, or 180

SHANGANI IRRIGATION DAM

LONGITUDINAL ELEVATION OF EMBANKMENT

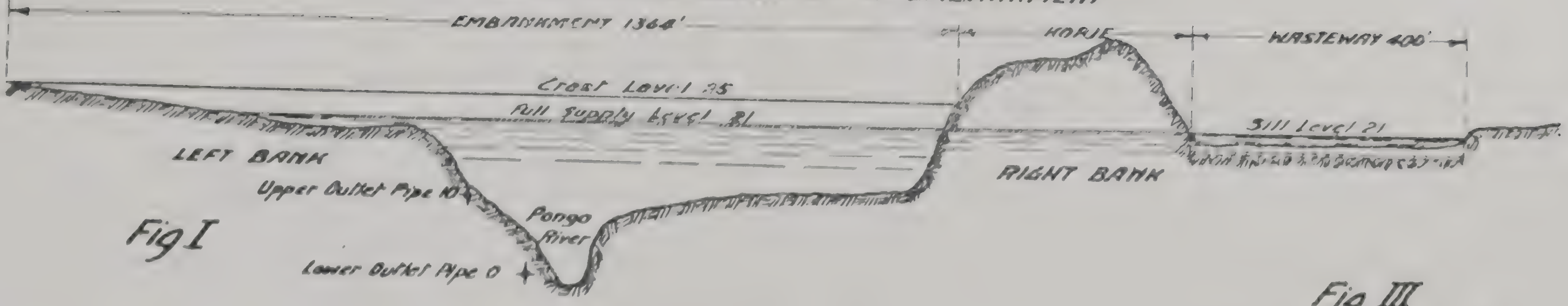


Fig I

CROSS SECTION OF EMBANKMENT

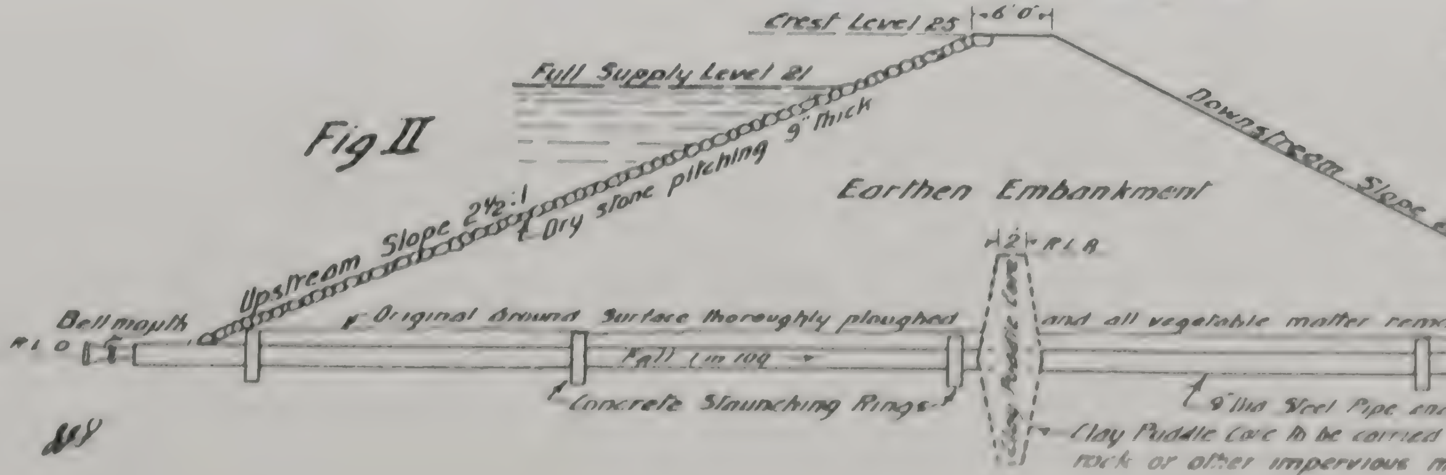
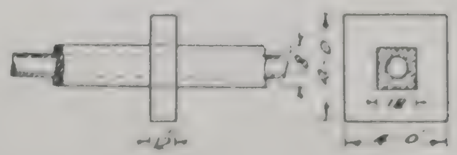

Crest Level 25
6' 0"
Full Supply Level 21
Dry stone pitching 9" thick
Upstream Slope 2½:1
Downstream Slope 2:1
Earthen Embankment
2
R L 8
Bellmouth
R L 0
Original Ground Surface thoroughly ploughed and all vegetable matter removed
Fall 1 in 100
Clay Puddle Core
Concrete Staunching Rings
9" Dia Steel Pipe encased in concrete
Clay Puddle Core to be carried down to rock or other impervious material
Sluice valve
Furrow

Fig II

Fig III

Detail of Staunching Rings



W

cubic yards per day of 10 hours. Middle size drag scrapers were used, drawn by two oxen and led by piccanins. On an average it was found that the working capacity of a scraper was 13 cubic yards a day with a lead of 150 yards. With shorter leads, as much as 18 cubic yards were tipped in a day.

The total contents of the embankment will be about 24,000 cubic yards. Work was begun on 1st July, 1914, and by the end of November nearly 20,000 cubic yards had been placed. Messrs. Knight & Folkestad of Hartley are the contractors for the work.

The total cost of the dam will be about £2,500; this sum includes engineering supervision and other contingent charges. Assuming a capacity of 135 million gallons, the capital cost for storage amounts to £18 10s. per million gallons, or an equivalent of £6 per acre irrigated.

The rains in November and December of last year delayed the progress of the work somewhat, with the result that the top seven feet of the embankment could not be built up before the heavy rains set in. A very heavy flood did some damage to the embankment by topping it and scouring out a portion of the downstream slope. Had it not been for the compactness of the material, the whole embankment would have been washed away; temporary measures have been adopted to deal with future floods until such time as the work can be completed. The photograph on cover was taken immediately after the flood had subsided.

As far as can be seen at present, the dam appears to be watertight, and, considering that there exists a gravel and boulder layer throughout the basin, which, in certain places, is exposed on the surface of same, the provision of the puddle core seems to have been justified.

Although the above notes are intended for the use of irrigating agriculturists who may have facilities for the construction of similar works, the writer would advise farmers to consult suitable technical advisers before embarking on such work. A great deal depends on making the utmost use of the natural features which present themselves for consideration in each individual scheme.

Sesame, Til or Gingelly.

(*SESAMUM INDICUM.*)

By J. A. T. Walters, B.A., Assistant Agriculturist and Botanist.

This little-known plant, which grows readily in Rhodesia and is much cultivated by the natives, is the source of the sesame oil of commerce. This oil is well known on the London market, and in the last issue of the bulletin of the Imperial Institute the price of sesame *seed* was stated to be from 56s. to 60s. per quarter (384 lbs.). Samples of the seeds for identification are occasionally received from farmers, who state that they are grown and used by the natives for food. Two varieties are met with—white sesamum, characterised by the white colour of the seeds; and black sesamum, with yellowish brown seeds. Both varieties have been grown at the Botanical Experiment Station, Salisbury, for some years past, but the difficulty of harvesting the crop, owing to the shedding of the seed and the consequent low yields obtained, has deterred us from bringing this crop to the notice of farmers. The importance of this crop on the European market, and the establishment of an oil factory at Salisbury, however, give the subject an importance which warrants a few notes.

The crop is grown commercially in every tropical and sub-tropical country of Asia, and in parts of tropical Africa. The total amount grown in India alone in the season 1909-10 is given in the Imperial Institute bulletin as 516,000 tons. Marseilles is the principal European port for the seed, and the amount imported in 1909 to that port alone amounted to 64,000 tons. It will be obvious from these figures that the crop is one of no mean importance, and further, seeing that it grows well in Rhodesia, it may well deserve greater attention than has been given it in the past.

The yields obtained at the Botanical Experiment Station, Salisbury, have not exceeded 224 lbs. of seed per acre. The loss from shedding in the process of harvesting was, however, very great. The native method of handling the crop is to pull the plants out by the root when the leaves change colour, stook it in an upright position in the field for seven days, during which the unripe capsules mature, and at the end of that time shake out the ripe seed. The plants are again allowed to stand for two days, when the remainder of the seeds can be shaken out. What the native yields of seed per acre are it is impossible to say. In India 450 lbs. per acre is considered a good yield, but an average return would not shew more than about 350 lbs. per acre. This latter yield should not be difficult to obtain in Rhodesia with proper attention being given to harvesting.

The oil content of sesame on a large scale varies from 42 to 48 per cent., and the same machinery is used in France for the expression of sesame and ground nut oil. The present prices of sesamum *oil* at Marseilles vary from £28 to £45 per ton according to quality. The residue is made into cake, which compares very favourably with most of the commercial feeding cakes. The cultivation of the sesame plant is exceedingly simple. It may be sown thinly broadcast, or in rows 18 inches apart, thinning the plants eventually to 6 inches apart in the rows. From 15 to 20 lbs. of seed will suffice to sow an acre. It does well on the poorer sand soils, and the crop requires about three months to mature.

Measles in Pigs.

By C. F. Johnston, M.R.C.V.S.

Measles as a disease affecting pigs is due to the presence in the muscular tissue of those animals of the cystic or young form (*Cysticercus cellulosæ*) of the tape worms (*Taenia solium* or *Taenia armata*), which are found in the intestines of man. The disease is produced by the animal swallowing the eggs of the tape worm, which are expelled in human excreta. When the eggs are ingested the embryos or young forms are liberated in the intestine, the membrane of which they perforate and reach the blood stream, by which they are carried to all parts of the body. Those which reach the muscular tissue develop into the cystic form, and at the end of a month are visible to the naked eye, and after about two months they become as large as a grain of barley.

The commonest muscles in which the lesions are found are those of the cheek, tongue, neck, chest, between the ribs, abdominal, heart, diaphragm, and inside the thigh.

Animals contract the disease up to about six or eight months old, and those which are allowed to graze at liberty are much more liable to contract the disease than those kept in confinement, as they are much more likely to discover human excrement in which eggs and embryos are present.

This disease usually develops without the animal shewing any symptoms, and during life it is hard to diagnose. On *post-mortem* the lesions are represented by cysts, *i.e.*, semi-transparent bladders, which contain a small head, and on cutting through the muscles, these may be seen appearing about the size of a grain of barley.

The chief danger of this disease is not to the lives of the infected animals, but to the fact that if infected meat in an insufficiently cooked condition be eaten by man its ingestion is followed by the development of the cystic form into the adult tape worm. If cooking was always perfect it would destroy the cysts, but the uncertainty in this respect prevents such meat from being consumed.

There is no curative treatment, and the only preventive measures are confined to rendering it impossible for animals to ingest the eggs of the tape worm, such as by keeping the young animals housed, and in a clean paddock.

It may be mentioned that this disease has appeared in some of the pigs which have been forwarded to the Bacon Factory, Salisbury.

A few useful Hints for a Farm Mechanic.

By Thistle.

When driving nails into native timber—new or old—rub some oil or antifriction grease on the nail, and you will find it drives much easier. You will also find that in driving long wire nails, a fairly heavy flat faced hammer is a much better tool than a light one.

When undoing a rusty or overscrewed bolt, pour a little paraffin oil on, allow it to soak for a few minutes, and the nut will be found much easier to unscrew.

Before putting a new bolt on a machine, rub some heavy oil or antifriction grease on the bolt threads. It will facilitate their removal again if wanted.

Always put the right diameter of bolt to the diameter of hole, otherwise any other bolts on that part will be taking undue strain, and be liable to fracture.

Before putting new shafts into axes, etc., brush the head of shaft with boiled linseed oil. The wedge should be iron rather than wood.

When wedging axe shafts, make a saw cut a little longer than the wedge. This will be found to prevent splitting when wedge is driven home.

Egg Circles.

By Cyril Allen.

Success in the working of egg circles demands that the members should all be imbued to the fullest extent with the spirit of co-operation. To attain this end is the greatest difficulty with which promoters of these societies will be faced, and too much emphasis can hardly be laid on its importance.

A very great advantage of egg circles is that they pave the way for wider co-operation, and practically provide the first steps to the larger work. They are educational, in that they familiarise the members with the principles of co-operation, and the difficulties that arise are largely the same as those they would have to overcome in a society of greater scope.

In egg circles there will almost invariably be the member who will send in produce accompanied by an invoice, and expect payment at once, whilst there are still, unfortunately, not a few who regard the scheme as some ingenious and inexplicable method of making money for somebody at their expense.

Another difficulty is that so few members take an intelligent interest in the working of the society, and are never heard except when payments do not reach the level they desired. An egg circle is essentially co-operative, and the trouble, as well as the profits, should be equitably shared. Still, all the difficulties may be overcome; the more easily if they are fully appreciated before the work is entered upon.

I have great faith in the future of these circles, and, at the request of the Editor, propose to give a few notes of an actual experiment. The experiment has not yet been in operation a year, and it is probable that later experience may cause the modification of some of the opinions expressed, or some alteration in the methods.

Under the title of the "Central Co-operative Society" an egg circle was formed last year at Iron Mine Hill, and was duly registered under the "Co-operative Agricultural Societies Ordinance, 1909," the rules being largely based on Model "A" of the Regulations published in the *Government Gazette* of 27th August, 1909. This registration is no light matter, for the law, framed for the full protection of members, makes many demands both in the drafting of the rules and the subsequent conducting of the society.

The ideal circle would be one where it would be at once possible to deal with a large supply of eggs, but there are few districts where this would be immediately possible, owing to the small number of fowls kept at each farm, and the consequent large area that would have to be covered. Where favourable conditions obtain, the method would be to raise a small capital, say, about £300, from the members, and with this sum provide egg boxes for forwarding the eggs, and a vehicle with donkeys or mules for collecting and transporting to the railway. There would have to be allowances made at each settlement for depreciation of stock. The current expenses would include payment to the manager and to the native employed in the work of collection.

I am convinced, however, that few districts could immediately launch out on this scale, though it should be possible after a year or two, when the number of fowls had increased.

The method adopted at Iron Mine Hill is for the members to forward the eggs to a centre, where they are checked and graded. The grading is a recent experiment, with the object of rewarding enterprise and providing that those members who supply the largest eggs receive the greatest profit. Whilst the freshness of all grades is equally guaranteed, the prices charged vary according to weight, eggs of 2 ounces or over being graded to Class A, between 1¾ and 2 ounces to Class B, and below 1¾ ounces to Class C. The experiment is too recent to warrant an opinion as to its effectiveness, but grading is practised in all the older egg-producing centres.

The prices received by the society vary very largely. Whilst it is still impossible for the members to guarantee a minimum supply, it is impossible to enter into contracts for long periods, and in consequence current market rates must be accepted, and these average much lower than contract prices. When the local markets are flooded, as is frequently the case, prices are low indeed; but even so, there is a small margin of profit.

The growth of egg circles will inevitably lead to export, when the average price will be considerably lower than that received for local consumption, and it would be well for poultry keepers to realise in time what is the actual cost of production. It will be found to be much lower than is frequently imagined.

There is a grave danger that an egg circle will be choked at its inception by working expenses. At Iron Mine Hill we have been fortunate in being able to conduct the work with the greatest economy. All the work done is voluntary, and the expenses are limited to actual out-of-pocket disbursements. Of course this condition cannot continue when the operations of the society are carried on on a large scale, but at that time the receipts will warrant larger expenses, and the proportion of running cost to each member will be low. The difficult period is the first year or two, for then the unavoidable expenses of dealing with fifty dozen eggs a week are practically as great as they would be for five hundred dozen.

Where it is found impossible to obtain voluntary assistance for the early work, then a manager must be appointed, and, if possible, paid on a percentage basis. Later on, if desired, a fixed salary can be arranged, roughly proportionate to the amount of work and responsibility involved.

Arrangements should be made for supplying each member with a pass book, which should accompany each delivery of eggs, the eggs being marked with the number allotted to the particular member. Entries of the number and grades of the eggs are made in the society's books and in the pass books.

In despatching eggs it would be well to avoid boxes with cardboard between the layers of eggs, especially in the larger boxes holding 30 dozen or 50 dozen eggs. The partitions may safely be of cardboard, but our experience is that the heavy handling the boxes receive in transit is too severe for the use of cardboard between the layers. This division should be of felt.

To make an egg circle practicable, farmers must, in most districts, improve the quality of the poultry they keep, and increase the number. Until we have much closer settlement the cost of collection will be too great where the produce of each farm, in this direction, is small.

Much hard work is necessary before an egg circle will travel along by its own momentum, but the work will be well repaid. To close as I began, I would repeat that the great essential of success is co-operation, and when that idea is fully comprehended progress is assured.

Since the date of writing the above the grading of eggs has been discontinued at Iron Mine Hill in consequence of the impossibility of making the purchasers understand the conditions. Some purchasers fail to understand why they should pay more for grade A than for grade B, both grades being "fresh eggs."

The Calf.

To teach the calf to drink, let it fast twelve hours, then take about two quarts of warm milk directly from its mother. Hold it in front of the calf. Put the first two fingers of the disengaged hand, palm uppermost, in the calf's mouth, allowing it to suck. Now quietly lower its head until the knuckles are below the surface. Spread the fingers a little, so that the calf can suck the milk through the canal formed between them. As soon as it gets a good swallow of the milk gradually withdraw the fingers. If young and hungry the calf will soon learn to drink in one such lesson. With refractory individuals a little patience will be required.—*(Elder's Weekly Review.)*

Poultry Keeping for the Rhodesian Farmer.

By Frank Sheppard.

As most of our adult stock is now moulting, a little extra care and attention should be given to enable the birds to moult successfully and to come on to lay again without any delay. Three months is the average time taken to complete the moult, and as this period is during our wet season, it is a somewhat trying time for the birds.

It is not advisable to force a moult, especially with breeding stock. It should be allowed to take its natural course, but a little assistance should be given as regards diet and housing. Care must be taken when the birds are coming on to moult that they do not carry any superfluous fat, or they will not cast their feathers satisfactorily, and will be unable to stand the increase in food which should be given when the new feathers are forming. In order to get the feathers to fall out rapidly in the initial stages of the moult, a cooling, non-stimulating food of poor quality should be given in small quantities and a good supply of green food. As the new feathers are forming, an increase of ration should be given, composed of foods rich in albuminous or nitrogenous matter, as these greatly assist the growth. Foods containing a large proportion of carbo-hydrates and hydro-carbates should not be used. Abundance of green food should be given. On no account should a laying ration be given, as we must not expect eggs from our moulting birds, and full grown pullets which are now laying should be fed and housed separately from the adult stock. If a tonic is given, a small piece of sulphate of iron in the drinking water will be found beneficial, and a teaspoonful of flowers of sulphur to each twenty birds in the soft food now and again will help the process, but if the moult is progressing satisfactorily, it is advisable to let it take its natural course and avoid the use of tonics, as in many instances more harm than good is done by them. The birds should be protected if possible against damp and cold, as if they are continually getting wet, through rain and wet grass, and are allowed to roost in damp and draughty houses or in trees, the progress of the moult may be seriously delayed. A dust bath should be provided, as the ground is usually too damp to allow the birds to dust thoroughly. If there is not a scratching shed attached to their house, a small shelter should be made wherein a low-sided box containing dry wood ash should be placed. The skin of a fowl is easily irritated during the moult, and the use of the dust bath is the only natural means it has of ridding itself of insect vermin, and is more satisfactory than frequent applications of insect powder.

One cannot fail to notice in Rhodesia, even in the show pen, the number of birds suffering from scaly leg, and although feather-legged birds are more liable to attack by the scaly leg mite than clean-legged, the great majority of birds in this country are of clean-legged varieties. This disease is not caused by the sandy soil, as is often supposed, but by a small mite (*Saroptes mutans*), which is encouraged if the birds are running on bare sandy ground.

Fowls housed and running on grass land are practically always free from scaly leg, as the shanks of the birds are kept clean by the continual friction of the grass. The majority of farm flocks of birds spend most of their time round the homestead, which is usually dry and sandy ground, and there is a deficiency of oily matter and a dryness of the skin of the legs of the birds. As a fowl not only casts its feathers but also the scales on the shanks during the moulting period, the legs should receive attention once or twice during the process, and all the old scales be removed, as it is under these that the scaly leg mite will burrow if they are allowed to remain. If this little extra attention were given to our birds during the moult, and they were run on the wet, dewy grass in the early morning, we should not see the number of birds suffering from this disease, which is so easily prevented and so quickly cured. Mild cases of scaly leg should be treated daily with paraffin oil.

which will soon soften the coating of scurf on the legs, which should be then brushed lightly with soap and water. Bad cases should be treated with a thick dressing of soft soap, which should be removed the next day with a brush and soap and hot water, but it will be found that paraffin oil will cure most cases. This disease is highly contagious, and affected birds should not be used as breeding stock, as it is also often propagated from a hen to her brood.

I have seen one flock of birds which, while heavy in moult, were housed in very small houses to enable them to keep warm, and were not let out till nine o'clock in the morning. The result of this treatment was that colds were running through the whole flock, and the birds looked far from healthy. Moulting birds should not be coddled in this way. Large dry open-fronted roomy houses, where they can get fresh air but no draughts, are the most satisfactory.

One of the chief causes of the lack of size and vitality and general deterioration in farm flocks of poultry is through allowing both sexes to run together all the year round, and most harm is done during the moulting season, when both males and females should be separated and given a complete rest.

If the breeding pens are large enough, and there is no fear of the ground becoming foul, the hens may be allowed to remain, but the male bird must be removed to a small pen or cockerel box. It must not simply be turned out of the pen and allowed to run with the mixed birds round the homestead, but for four or five months at least must be kept apart from the females, if fertile eggs and healthy chicks are to be looked for next season. As the cockerel boxes are not continually in use, they can be made quite small. A small house suitable for one bird with run attached 3 ft. square is quite large enough if moved daily on to fresh ground. The sides of the run should be netting, and sacking on the roof will protect the bird from the sun. If the cockerel boxes are made of a fixed type, a larger run will be required, but I have always found the movable ones the more convenient.

During the heavy rains which we expect in January and February, there are few flocks of young chicks that are alsolutely free from colds, which, if not attended to in time, will probably develop into roup. As the average poultry keeper has little time to devote to his sick birds, I think a few words on the prevention of colds will be of use.

Dry, roomy sleeping quarters, which are well ventilated, but not draughty, should be provided for the chicks, and a small quantity of finely chopped onion should be boiled in with the soft food. A small pinch of powdered camphor should be put in their drinking water and renewed each time fresh water is given. If these simple precautions are taken there need be no fear of colds. Any signs of small bubbles in the eyes, or running at the nostrils, should receive prompt attention, as these are the usual symptoms of cold. All affected birds should be isolated at once in a clean dry coop. Any birds which have developed roup can easily be distinguished by their swollen head, closing up of the eyes, and the white cheesy matter which rapidly forms under the skin round the eyes or in the mouth. These birds should be killed and either burnt or buried at once, as, if cured, they will probably develop weak and unhealthy chicks, and should never be used as stock birds. Before being placed in their isolation quarters, the birds affected by colds should have their nostrils and mouths thoroughly cleansed by the beak and nostrils being held for a moment in a warm, strong solution of permanganate of potash. Their soft food should contain a larger proportion of onion and camphor than was previously given. The various cures for colds usually given in publications on poultry diseases are usually good, but of a somewhat lengthy nature when there are many birds to receive individual treatment, and time is valuable.

The above simple cure will be found satisfactory in most cases, and as all the birds are treated collectively, little time is wasted.

All the young stock now running on free range will pick up a great amount of natural food, and to ensure against waste, all the soft food should be given in troughs, which should be placed in a shaded position.

On dull days, four or five flocks of well grown pullets, which are housed close to the edge of my somewhat limited mealie lands, can be seen ranging over the ground and following the natives, just as we see the rooks and gulls following the plough in England. These pullets require very little food during the day, but always receive a full ration morning and evening.

Fowls should not be made to forage for all their food, as I am afraid is the case on many farms. It has long since been proved that the hard, lean, scraggy bird does not make the best egg-producer, and is practically useless as a table bird.

Do not keep any birds through the moult which will not pay for themselves next season. All surplus cocks and cockerels should be marketed, and the old hens will be found quite passable for the home table if given a teaspoonful of vinegar before being killed.

I am afraid at the present time breeding pens and cockerel boxes are conspicuous by their absence on most Rhodesian farms where poultry are kept, but I hope the day is not far distant when poultry will be treated seriously by the farmer as one of the chief branches of agriculture. In a new country like Rhodesia we cannot expect a large poultry industry to develop amongst the farmers in a year or two, as their minds are at present fully occupied solving the many mysteries confronting them. When the time does come for the farmer to give more attention to his poultry, we hope he will take his American cousin as an example. The large flocks of pure-bred birds to be seen on American farms, even on the western plains, not only shew that he realises the benefits and profits to be gained from the combination of poultry and agriculture, but also that pure-bred stock is more profitable than cross-breeds.

Some Observations on Bee-Keeping in Rhodesia.

By J. S. Blackwell.

On starting an apiary, the bee-keeper has to decide for himself what kind of hive is to be used. Since there are many different styles of movable-comb hives, it is important that this matter should be carefully considered before a selection is made. One point must be insisted upon, and that is, whatever kind of hive the beginner decides to adopt, only one size of frame be used throughout the apiary. The writer has seen two kinds of hives used in Rhodesia:—(1) the "W.B.C." hive made to the specifications of Mr. W. Broughton Carr, and used by a large number of apiculturists in Great Britain and elsewhere; and (2) an American hive commonly used in the United States of America and Canada.

The outside dimensions of the frame of the "W.B.C." hive being considerably smaller than those of the American pattern, it is obvious that the frames of the two hives are not interchangeable, and therefore such an operation as "uniting" swarms would be extremely risky if it were desired to unite a swarm in a "W.B.C." hive with another in an American hive.

It is not my intention here to examine in detail the merits of these two admirable types of hives. It may safely be asserted that in Rhodesia, as well as in the Union of South Africa, the American hive finds most favour among bee-keepers. This being so, there is a great advantage in adopting the make of hive most commonly in use.

There are, however, one or two points in regard to each of these hives which deserve consideration. The standard frames of the "W.B.C." hive are fitted with what are called "W.B.C." metal ends, which, by changing the ordinary wide metal ends on all or alternate frames as desired, enable the frames to be placed closer together, thus preventing the bees from clustering too thickly on them, or they may be placed farther apart, in order to enable the bees to cluster as thickly as possible in winter for greater warmth, and also to enable them to build drone combs in spring and summer.

In the American pattern the distance between the combs is regulated and fixed by the top bar of the frame, which is made of stouter wood. Having no metal ends, the space between the combs remains constant, and cannot be reduced at will.

Doubtless bee-keepers have observed occasionally a tendency among native bees to refuse to work in the supers at a time when in the brood chamber they are overcrowded. This refusal to enter the sections, when the honey flow comes round, causes considerable loss of honey. A simple remedy whereby bees may be induced to work in the supers is to remove some of the frames, containing honey only, from the brood-chamber, and to contract the brood-nest by placing the frames closer together. Being overcrowded below, the bees run up into the supers, especially if these are already provided with foundation comb. While these metal ends in the "W.B.C." hive permit this remedy being applied, it is not so easy to apply it effectively in the American hives, owing to the fact that the frames cannot be brought closer together, although the removal of the honey-combs and the contraction of the brood-nest by division boards does cause the bees to be overcrowded to a certain extent.

As soon as the success of this remedy is assured, the hive should be opened and the frames in the brood-nest replaced at the regulation distance. If this is not done, there is a danger that the bees, being cramped for room or distressed from want of proper ventilation, will swarm.

Swarming during the honey season should be prevented and discouraged. This can usually be done by allowing the bees plenty of room in the supers in advance of their requirements, and by giving space in the brood-nest for the queen to oviposit. This may be done by extracting honey from one or more of the frames and replacing them. If in spite of these precautions a hive is seized with the swarming mania, the only remedy is to examine the brood-nest once a week, make sure of the presence of the queen, and either to remove a frame containing a queen cell, giving it to a queenless colony, or to cut out all queen cells and destroy them, if no use can be made of them.

The British make of hive has an inner wall and an outer casing with an air space between. This spacing is useful for "wintering" the bees, for it can be filled with bran or small pieces of crumpled paper, thereby maintaining an even temperature within the hive. The outer casing is also very useful when the hive is examined in windy weather, for it serves the purpose of a screen, and thus prevents the bees from being blown off the frames.

The American pattern, being single walled, is made throughout of stouter wood. But the main advantage which it possesses over its British rival is its greater simplicity of construction. The practical advantage of this greater simplicity is that it enables the owner of American hives to construct similar ones for himself when increasing his apiary. One very successful Rhodesian bee-keeper has very ingeniously constructed a large number of hives to contain the American standard frames out of paraffin cases, and found them most serviceable. His apiary consisted of between 20 and 30 hives, the great majority of which he had himself made.

In selecting a site for an apiary, care should be taken to provide as much shade as possible. At the same time proximity to fowl runs, stables, cattle kraals or byres should be avoided, for native bees sometimes become angry for no apparent reason, and mercilessly attack poultry and other live stock, frequently with fatal results. A good position for an apiary is a sheltered and secluded corner of an orchard, as far removed from live stock and dwellings as possible.

Hive entrances may face in any direction, but, I think, a northerly aspect is best. A hive facing north is sheltered from the strong easterly winds which are so prevalent in Rhodesia. The hives should be set on stands, the legs of the latter being placed in tins, which, when filled with water and a teaspoonful of paraffin oil, effectually prevent ants and other pests from entering the hives. For the same reason, the ground under and near the hives should be kept clear of weeds and long grass. The oil prevents mosquitoes from breeding in the tins.

Having decided on the type of hive to be used, and having selected and prepared a suitable site, the bee-keeper in Rhodesia has many circumstances in his favour.

Firstly, the supply of native bees is so plentiful that he need not incur any expense in purchasing swarms, which are to be had for the taking during the spring months of September and October, and also during the autumn months of February and March. Indeed, bees save one the trouble of seeking them, for few people in Rhodesia have not been visited by swarms during the months named. The visitors are more often than not regarded as unwelcome guests, and are usually either driven away or destroyed.

Secondly, the climate, with its abundant sunshine, especially during winter months of May, June and July, enables bees to be working more or less all the year round.

Thirdly, the apparent immunity from any serious or infectious diseases among bees assists in maintaining the strength of the colonies.

Fourthly, the promulgation of Government Notice No. 228 of 7th October, 1909, prohibiting the importation of bees, beeswax, honey, foundation comb, etc., except under the most stringent regulations, not only tends to minimise the risk of introducing such contagious diseases as foul brood, but also provides an excellent market for the disposal of honey and wax at most remunerative prices within easy reach of the apiary.

Lastly, the abundant supply of nectar and pollen is undoubtedly the best inducement to follow the pursuit of bee-keeping.

With all the facilities and advantages possessed by the bee-keeper, it is surprising that the craft of apiculture is not more widely followed in Rhodesia. The art of bee-keeping has during recent years made so much progress that its pursuit is no longer a question of chance, but of certainty, given favourable seasons and careful attention to the bees.

It is difficult to say what is the most suitable time of year to start bee-keeping. The best method would be to have two or three hives of the type selected ready by the end of July; and either to purchase a swarm of bees or to await the advent of swarms during the spring months of August, September and October. Swarms captured and hived in these months will require very little attention as regards feeding, since this period probably provides the better of the two honey flows of the year. Nectar and pollen are now very plentiful, for not only can the bees be observed visiting the flowers in the orchard, but many native trees and flowers are now coming into bloom. The Msasa tree blossom is a particular favourite of the bees at this season, and it provides an abundant source of very excellent honey, in flavour not unlike the best apple honey.

At first the swarms should be given sufficient frames, in which comb-foundation has been inserted, for them to cover. These must be examined frequently, and the number increased in advance of the requirements of the bees until the brood-nest is nearly full, when a super should be added, a sheet of zinc-excluder being placed between the brood-nest and the super to prevent the queen bee from entering the super and laying her eggs therein. When the super is nearly filled with honey and the cells are about to be sealed, another empty super should be placed in position. If the bees do not work in the second super, a good plan is to interchange the supers, placing the empty super between the brood-nest and the nearly completed super. This will compel the bees to pass through the empty super in order to gain the top super, and complete the work of sealing the cells. If the honey flow continues, and the hive is not weakened in numbers by the issue of swarms, a third super may be added when the first completed super is taken off. The process may be continued until the supply of nectar is observed to be falling off. When this occurs, no further supers should be given to the bees, which should now only be allowed to seal the combs which have nearly reached completion, and a few days later all unsealed honey should be extracted.

This procedure may be followed whether the bee-keeper desires comb or extracted honey, or both. If working for extracted honey, it is useful to get the bees to work out a number of shallow frames, and, after the first extraction, to keep on hand a number of empty combs, which, if supplied to the bees, give them several days' start, since the time required by the bees to build the wax cells is thus saved—an important matter, seeing that the season for collecting honey and pollen is very limited.

When the supply of honey has ceased, one must be careful to examine the hives and leave enough honey in the brood-nest as food for the bees until the summer is well advanced. It is difficult to lay down hard and fast rules as to the quantity of honey to be left in the hive, as so much depends on the size of the swarm. This question of feeding the bees is most important, since the health and vigour of each colony depends on an ample supply being left them in their larder. With a little experience the bee-keeper will soon know how much honey it is necessary to leave with each swarm to carry it on to the next honey flow. Be sure of this, however, the bees will repay the loan most handsomely. The most successful bee-keeper is he who, by careful feeding, keeps his colonies strong and accelerates the hatching of new brood before the honey season arrives, so that the young bees are at full strength and ready to harvest the honey at once. Otherwise much valuable time is lost by the bees in hatching out new brood at the time they should be gathering honey.

If it so happens that a swarm is hived when honey is not plentiful, it will be necessary to provide the bees with food. A good spring and summer food for bees is made by boiling the following mixture for a few minutes:—

10 lbs. white lump cane sugar,
7 pints water,
1 oz. vinegar,
½ oz. napthol beta solution,
1 oz. salt.

To make napthol beta solution, dissolve one ounce of napthol beta in 7 ounces of pure methylated spirit. This is most easily done in an 8 oz. medicine bottle.

Besides feeding, pollen is necessary for the rearing of young bees, and, if not naturally plentiful, it should be supplied artificially. To do this, mix a small quantity of pea flour with bran and place it in some sunny corner of the apiary. A small quantity of honey placed on the flour will prove irresistible to the bees. The dish should be removed when natural pollen is procurable.

The best way to feed the bees is by the use of an ordinary wide mouth bottle filled with the syrup made as above-mentioned. Tie a piece of calico over the mouth and place the bottle inverted on a piece of wood having a small hole in the centre. These should be placed in position on the top of the frame above the sacking, in which a hole smaller in size than the wood has previously been cut. When artificial feeding is no longer necessary, the hole in the sacking can be covered by another piece of sacking cut larger than the hole or by a fresh piece.

When bees are properly hived and fed, they rarely desert the hive, but if this should happen, a good plan is to reduce the entrance to the hive and to fix in the narrow entrance allowed a piece of zinc-excluder. This will imprison the queen, and the colony will soon settle down. When the swarm establishes itself in the hive, the excluder should be removed from the entrance.

At all seasons of the year bees require water. A basin of fresh water should, therefore, be placed near the hives, and small floats of cork or wood provided for the purpose of a landing stage, so as to enable the bees to drink more easily, and to avoid losses through drowning.

During the months of November and December the activity of the bees will have diminished considerably, the first honey flow being now practically over. The strength of colonies should be maintained by artificial feeding if required, in readiness for the autumn honey flow, and if necessary the rearing of young brood and drones should be stimulated by uncapping some of the honey combs. Sometimes a queen proves to be a drone breeder. If this is observed, the queen must be destroyed or the colony will perish. In such cases it is best, after destroying the queen, to unite the queenless colony with another. This is readily done by placing the hives close together, and after dusting the bees of both stocks with flour, put the frames alternately into one hive, spacing them so widely apart that the bees cannot touch each other. The bees are too busy removing the flour to think of quarrelling. Next day the frames may be brought to their regulation distance from each other. Other reasons for uniting two swarms are to make one strong colony out of two weak ones, and to double the strength of a colony when working for extracted honey.

The second honey harvest of the year is gathered during the months of January, February and March. Many plants yielding a plentiful supply of nectar and pollen are now coming into bloom. Rhodesia, though not favoured with heather or clover fields, has an abundant supply of blossoms producing either honey or pollen. To mention but a few, attention may be drawn to buckwheat, rape, dahlia, sunflower, citrus trees and bananas. These and many others assist in the production of pure honey of a delicious flavour.

During the month of April the activity of the bees will be observed to be lessening; and as the supply of honey and wax diminishes, it will be noticed that the slaughter of the drones by the worker bees has commenced. The reason for this is that the function of the drones in keeping up the temperature of the hive during the process of making honey and fertilising queens is no longer necessary. They have no sting, and make a great buzzing noise when disturbed. Drones lead an idle life, and do not bring either honey or pollen to the hive, but exist on the labour of the worker bees. Their services not being required again until the advent of spring, they are either killed by the workers or driven out of the hive to perish. When the absence of drones is noticed, the bee-keeper may be sure that the supply of honey is diminishing. He should now extract all unsealed combs and give them back to the bees to clear up any honey that may have been left in them. The combs should then be put away safely for use in the following spring. The number of frames in the broodnest should be reduced according to the strength of the colony, and they should be placed about 1¾ inches apart from centre to centre, to allow the bees to cluster on them for warmth.

Contract the space allowed the bees by the use of division boards, and reduce the size of the entrance to the hive to prevent a weak colony being robbed of its stores by a stronger one. Leave enough frames of sealed honey in the brood-nest to carry the bees through the winter. If the supply of honey in the brood-nest is insufficient, feed the bees rapidly with syrup, made as above described, but reduce the quantity of water by two pints and the salt by half an ounce. Some of the strongest colonies may be employed for this purpose, by giving them empty combs to fill, and as soon as these are sealed they may be removed and given to weaker colonies which require them. Care should, however, be taken to leave only sealed stores in the hive, as unsealed honey is liable to produce dysentery among the bees. This often causes a strong colony to be so weakened by spring that, instead of being ready for a good year's work in the following season, it will barely succeed in maintaining itself.

These precautions having been taken, all that remains to be done is to prepare the hives for the winter months of May, June and July. From twenty to thirty pounds of sealed stores having been given to each colony according to its strength, place two or three pieces of wood five-eighths of an inch thick to allow bee-way across the top of the frames, and cover up with three or four pieces of sacking to provide the necessary warmth. After the bees have been settled for the winter, they should be disturbed as little as possible; but it is wise to examine them about the middle of June to ascertain if they have sufficient stores to carry them on till the end of July, when breeding may again be stimulated by spring feeding. If it is found that food is becoming scarce in some of the hives, supply them with "Good's Candy," which is made by mixing warm liquid honey with finely-powdered loaf sugar, kneaded to the consistency of stiff putty until all the honey is absorbed. Place the candy on the top of the frames under the sacking.

A honey-extractor should be found in the equipment of every bee-keeper. This machine, obtainable from all purveyors of bee accessories, serves two most useful purposes. Combs from which honey is to be extracted are first uncapped. This is done by the aid of a long knife—a carving knife will do very well—dipped in a jug of boiling water, and then a thin slice is cut off the cells on both sides of the frame. The frames are inserted into the revolving cage of the machine, and when one side is emptied by centrifugal force the combs are reversed and the honey removed from the other side in like manner. This operation leaving the cells uninjured, permits of the combs being returned to the bees to be refilled. As bees are estimated by good authorities to require from 20 to 25 pounds of honey for their own consumption in producing and building one pound of wax cells, the advantage of having such a machine can be realised. But this is not the only purpose for which the extractor is useful. It has been noticed above that sometimes the queen is left without cells in which to lay her eggs, on account of the fact that many of the combs in the brood-nest are filled with honey because the workers will not readily work in the supers. By extracting the honey from brood-combs, the queen is provided with room for egg-laying, and the workers are by this method frequently prevented from swarming, and thus reducing the strength of the colony.

A good smoker is considered by many bee-keepers as indispensable for subduing bees. When bees are alarmed they hastily fill themselves with honey from their stores, and at such a time they are not disposed to sting and rarely do so unless hurt. Therefore, when it is desired to inspect a hive, blow a few puffs of smoke into the entrance with the smoker. Give the bees a few seconds to fill themselves with honey, and then open the hive and blow in a few puffs of smoke from the top, so as to drive the bees to the bottom. In removing the frames for examination, the greatest care is necessary not to kill or crush the bees.

It is often observed that native bees become very irritable as a result of smoke. It is, therefore, preferable to use a subjugator simpler but equally effective in its application. This is to be found in carbolic acid. Take two parts of water to one of Calvert's No. 5 and sprinkle it on a piece of calico a little larger than the dimensions of the surface of the hive, gently remove the sacking and replace by the carbolised cloth. Those who use carbolic acid for the subjection of bees should be cautioned that, being a very strong poison, it is liable to burn the hands, and should therefore be used with the utmost care.

When examining hives, do not stand in front of the hive entrance, thereby obstructing the flight of the bees; always stand behind the hives.

Native bees being much more vicious than European bees, it is always wiser to wear a bee-veil to protect the face, and rubber or thick woollen gloves and gauntlets to protect the hands and arms. A serviceable veil is made of black net about a yard square; sew the ends together, hem top and bottom, insert elastic, drawing it in at the top to fit tight round the crown of a broad-brimmed hat, and round the bottom to fit closely round the waist. Two arm holes should be provided and drawn in with elastic to fit tightly under the armpits. The gauntlets may be made of thick calico having elastic inserted at each end, one to fit above the elbow and the other may be fastened to the glove. When stung, remove the sting, but do not rub the spot, as this tends to spread the poison. Numerous remedies have been recommended: moistened tobacco, raw onion, blue bag, tincture of myrrh, and many others alleviate the irritation. No two people, however, are affected in the same manner; one may suffer acutely, while another feels little or no pain.

The best time to examine hives is during bright sunshine, when most of the workers are away gathering stores. It is advisable not to inspect the hives on a dull, cloudy day, for bees are inclined to remain at home in such weather. Some apiculturists, however, prefer to manipulate the frames at night by the aid of powerful lamps, although the whole swarm is present in the hive. The reason given for working among the hives at night is that the bees, not being able to see well, are not likely to become so angry as during the day. This may be so, but there is the certainty that a large number of bees will perish during a cold or rainy night through inability to regain their hives.

Correspondence.

EXPORT OF MAIZE.

Sir,

The details of charges given below are for the information of farmers who are interested in our proposal to export mealies on commission, paying out 90 per cent. of the London or other Home market value, less charges, at time of shipment:—

As cost of cables, exchange and petties—1d. per bag.

As commission, to be shared by our London agents and ourselves, on selling price—3 per cent.

The present current costs of transmission are as follow:—

Railage to Beira. East of Gatooma and including the Mazoe and Lomagundi branches. Flat rate, per ton—12s. 6d.

Portuguese charges for grading, per bag—½d.

Portuguese export duty (approximately), per bag—½d.

Lighterage from wharf to ship, per long ton—2s. 6d.

Freight, Beira to London, per long ton—12s. 6d., plus 25 per cent.

Insurance. Ordinary F.P.A. policy—3s. 4d. to 5s. per cent.

Given good bagging and regular weights, it is possible to insure against loss of weight at outturn at rates varying from 20s. to 25s. per cent.

The above charges, excluding our own, run out at about 3s. 3d. per bag. If war risk is still required, it will be charged at the ruling rates. Unfortunately it has been found impossible, so far, to get the railways to put the private shipper on the same basis as those making use of the railway agency, and the private shipper is handicapped thereby to the extent of 3d. per bag, besides which he is liable for any storage charges incurred at the port of shipment.

There are no interest charges of any kind. The full 90 per cent., less charges, is paid out in full, and commission, etc., due to ourselves is deducted from final account sales.

Shippers must use 2½ lb. bags of first quality; the mealies must be thoroughly dry; they should be of as uniform quality as possible (it has been found that mealies shelled by hand power are usually of superior grade to those shelled by the steam sheller); bags should contain an average of 203 to 205 lbs., and they must be port marked as per instructions to be received.

Regular market reports will be received from London, and will be communicated to farmers who may be interested. To enable us to make the necessary arrangements for freight, it is desirable that we be informed as early as possible after March as to probable quantities and date shipment is wanted.

We have been encouraged by the numerous enquiries received, and hope that business to mutual advantage will result.

Yours, etc.,

J. W. Downie,
For R. S. Cotton.

Review.

Garden Annual, by Norman T. Baker, F.R.H.S., Editor, "S.A. Gardening."

This is an excellent little work giving hints and advice to amateurs, with an excellent calendar for insect pests, and recipes for compounding insecticides and manure. It should be found a very useful aid and guide to the work in the flower and vegetable gardens, as well as in the orchard, and will be appreciated by all gardeners. Information is also given regarding the propagation of plants, fruit growing and marketing, and poultry keeping, while handy recipes are given for the home. The price of this annual is one shilling, and it is obtainable from the Horticultural Publishing Co., P.O. Box 3958, Johannesburg.

The Agricultural Outlook.

The 1914-15 season will be remembered as one of the most promising we have ever had in this Territory. Rains commenced early in December, and have been continuous ever since throughout the whole of the country. The precipitation has been heavier in Matabeleland than in Mashonaland, although, as will be seen from the rainfall returns published towards the end of this *Journal*, Victoria has had an exceptional amount of rain. Records have been created in many places, and in no fewer than 13 stations have over 3 inches of rain been recorded during a period of 24 hours. Farmers generally are jubilant at the prospects of the harvest, but in some places cultivation has been impossible, owing to the lands being unworkable, and a spell of fine weather would be much welcomed. In seasons like this, and where water is apt to lie on the land, the wing shovel plough is a useful implement to use in the cultivation of the maize crop, as it materially aids in the drainage of any surplus water that may otherwise be harmful to the crop. Caterpillars have caused considerable damage to fields of maize in parts of the country, and in one instance we hear of a farmer having to replant a large area three times owing to the depredations of the pest. The article dealing with the subject which Mr. Jack has written for this *Journal* will be read with much interest.

The effects of the drought were felt rather severely in the Plumtree, Gwanda and Nyamandhlovu districts, but stock everywhere are now in prime condition. Three-day sickness has re-appeared in parts of the country, but the mortality has been practically nil, animals, if left alone, recovering after the complaint has run its course.

There is an insistent demand for pigs for breeding purposes, and there is every indication that the supply sent in to the Bacon Factory will be considerably augmented in the near future.

Veterinary Report.

November, 1914.

SALISBURY.

African Coast Fever.—No fresh outbreaks.

Existing Outbreaks.—One case occurred at the M.T.C. farm and one case at Bluff Hill.

BULAWAYO.

Tuberculosis.—Nineteen head of cattle were tested, with no re-action.

Importations.—From the Union: Donkeys, 57; heifers, 42; bulls, 2; sheep and goats, 2,890. From England: Heifers, 8; bulls, 5. From Northern Rhodesia: Oxen, 36.

Mallein Test.—Fifty-seven donkeys were tested for glanders on importation, with no re-action.

UMTALI.

African Coast Fever.—No fresh cases. There were some deaths amongst cattle as the result of poverty, owing to drought.

MELSETTER.

African Coast Fever.—No fresh outbreaks. Three deaths occurred at Nooitgedacht.

INYANGA.

Scab.—One outbreak.

GWELO.

Enquiry was made into numerous deaths in certain herds of cattle, and the cause was attributed to strongylosis.

VICTORIA.

Three-Day Sickness.—A considerable number of cattle were reported to have suffered from this complaint.

Glanders.—Six donkeys and one mule were tested with mallein on importation, with no re-action.

GENERAL.

There have been small losses amongst cattle throughout the country from drought. Three-day sickness has been prevalent in several districts; few or no deaths have occurred where animals have been left to themselves to recover. A mule which had been in the Mafungabusi district was found to be suffering from trypanosomiasis.

December, 1914.

SALISBURY.

African Coast Fever.—No fresh outbreaks.

Existing Outbreaks.—Only one case occurred at Epworth.

Contagious Abortion.—On enquiry into the history of the cattle on Gatzi, Marandellas district, two further outbreaks were discovered on farms on which cattle of the same origin were placed.

BULAWAYO.

Tuberculosis.—Nine heifers were tested at Gwanda, and one destroyed.

Scab.—One outbreak.

Glanders.—Six horses, 4 mules and 20 donkeys were tested with mallein on importation, with no re-action.

Importations.—From the South: Horses, 8; mules, 4; donkeys, 20; bulls, 10; heifers, 80; sheep and goats, 3,810. From Northern Rhodesia: Oxen, 513.

UMTALI.

African Coast Fever.—No cases at any of the infected areas.

Glanders.—Nine mules were tested with mallein on importation, with no re-action.

GENERAL.

Exceedingly heavy rains have fallen throughout the Territory, and the condition of the stock is rapidly improving.

C. R. EDMONDS,

Acting Chief Veterinary Surgeon.

Market Reports.

The produce markets at Bulawayo and Salisbury are plentifully supplied with all lines.

There have not been so many stock sales as usual during the past two months. Mr. A. G. Hay held a sale at Gwanda on the 12th December, at which over 400 head of cattle and 200 head of small stock were disposed of. The following were the prices realised:—Slaughter oxen, £5 10s. to £12; native breeding stock, £3 15s. to £6 10s.; goats, 9s. 6d. to 10s. At Mr. A. E. White's sale at Gwelo on the 16th December prices were as follows:—Slaughter stock, £10 to £15 15s.; trek oxen, for which there was a good demand, £6 to £10; young oxen (untrained), 3 to 4 years, averaged about £6; heifers, £6 to £10; native heifers, £4 to £6; cows and calves, £6 5s. to £9; goat ewes (young), 5s. to 9s.; mules, £18.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs.	8/11	—	—	27/6
Beans, 203 lbs.	16/0 22/3	—	—	25/0 35/0
Boer Meal, unsifted, 200 lbs.	—	—	46/6 47/6	42/6
Bran, wheaten, 100 lbs.	6/6 6/10	—	12/9 13/6	15/6
Flour, 100 lbs.	—	—	—	25/0 27/6
,, Colonial, 100 lbs.	—	—	26/0 27/0	—
Forage, 100 lbs.	7/3 10/0	—	10/0 11/0	—
,, Colonial Oat	—	—	—	8/6
	Bale.		Ton.	
Hay	9d. 1/5	—	65/0 70/0	—
Kaffir Corn, 200 lbs.	10/0 11/5	—	16/6 17/6	12/6
Manna, 100 lbs.	—	—	—	—
Mealies, S.A. White, 203 lbs.	10/3 10/6	—	13/0 13/6	9/6 10/6
Mealies, Yellow, 203 lbs.	12/0 12/4	—	12/6 13/6	—
Mealie Meal, White, 183 lbs.	—	—	—	10/0
Munga, 200 lbs.	—	—	—	12/6
Monkey Nuts, bag, 83 lbs.	—	—	10/0 11/0	7/6
Oats, 150 lbs.	—	—	—	26/6
Onions, 120 lbs.	5/0 13/6	—	14/0 16/6	17/6
Peas, 200 lbs.	—	—	—	—
Potatoes, new, 150 lbs.	10/0 12/9	—	20/0 22/6	10/0
,, old, 150 lbs.	4/0 9/6	—	—	—
Rapoko	—	—	—	8/0
Rye, 200 lbs.	—	—	—	30/0
Salt, 200 lbs.	—	—	10/0 11/0	12/6
Wheat, 203 lbs.	24/0 27/6	—	—	35/0
Butter, local, per lb.	—	—	—	1/6 2/6
Eggs, local, per dozen	2/0 2/7	—	2/9 3/0	2/6
Ducks, each	—	—	—	3/0 5/0
Fowls, each	1/6 2/8	—	—	3/0 7/6
Geese, each	2/10 3/6	—	—	7/0 9/0
Turkeys, cocks, each	6/0 12/6	—	—	15/0 17/0

LIVE STOCK.

Slaughter Cattle, 100 lbs.	37/0 38/0	—	35/0 40/0	37/6 40/0
Trek Oxen, trained	£7 £8	—	£6 £9	£8 £9/10
Local Cows, milk	£7 £8/10	—	£17/10 £30	£16 £25
Dairy Cows	£15 £25	—	£20 £35	—
Native Cows	—	—	—	£7/10 £8
Heifers, Colonial	£4 £5	—	£8 £17	£8 £9/10
,, Native	—	—	—	£4 £7
Pigs, live weight	5½d.	—	3d. 4d.	3½d. 4d.
Horses, riding, salted	—	—	—	£35
,, ,, unsalted	£10 £15	—	£15 £35	£20 £35
Mules, inoculated	£20 £25	—	£30 £40	£25 £30
Donkeys, geldings	£3 £5/10	—	£3/10 £5	£5 £7
,, mares	—	—	£5 £6	£7 £9
Goats	12/6 16/6	—	10/0 17/6	15/0 22/6
Persian Ewes	17/0 19/6	—	—	20/0 22/6
Cross-bred Ewes	11/6 16/6	—	—	20/0 22/6
Sheep, slaughter	11/0 16/6	—	15/0 20/0	20/0 25/0

Weather Bureau.

TEMPERATURES.

Station	November		December	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MASHONALAND—				
Hartley, Gatooma	91·7	62·8	84·3	—
,, Giant Mine ...	—	—	—	—
,, Hallingbury Farm ...	89·4	63·3	81·8	64·3
Lomagundi, Eldorado Mine ...	89·6	63·5	85·0	65·2
,, Kanyemba ...	—	—	—	—
,, Sinoia	89·8	61·9	84·3	64·2
,, Sipolilo ...	89·5	63·7	84·0	64·9
Makoni, River Junction ...	—	—	—	—
Mazoe, Shamva Mine ...	88·9	65·6	83·4	66·7
Melsetter	76·9	—	71·5	69·7
,, Mount Selinda ...	80·8	59·3	—	—
,, Vermont	—	—	—	—
Salisbury, Chishawasha ...	85·2	57·7	78·4	62·1
,, The Gaol... ...	88·7	57·7	81·6	60·1
,, Agric. Dept. Offices ...	—	—	77·4	60·2
Umtali, Chiconga's Location ...	87·4	61·4	84·0	65·6
,, Summerfield ...	74·8	62·0	66·5	—
Victoria	85·2	61·2	81·7	73·1
MATABELELAND—				
Bulawayo, Essexvale	87·9	63·0	81·3	67·0
,, Observatory ...	85·4	60·6	79·1	61·4
,, Rhodes Matopo Park...	93·3	62·2	81·8	63·1
Gwelo, The Gaol	85·1	72·3	—	—
Mangwe, Empandeni ...	92·6	—	83·7	72·4
Tuli	94·6	67·0	90·0	69·6
Wankie, The Hospital ...	97·5	71·9	86·7	—
Victoria Falls	95·8	56·8	—	—

RAINFALL.

Station	November	December
MASHONALAND :		
Charter—		
Buhera	2·95	12·14
Driefontein	2·26	13·25
Enkeldoorn	1·24	12·21
Grootfontein	1·75	16·02
Marshbrook	3·43	—
The Range	1·18	10·94
Riversdale	2·23	9·14
Umvuma (Railway)	2·22	—

RAINFALL—*(Continued).*

STATION	November	December
MASHONALAND—(Continued)		
Hartley—		
Ardgowan	2·31	13·84
Auchter Leny	1·68	17·35
Battlefields (Railway)	2·94	—
Beatrice Mine	4·83	—
Carnock Farm	3·39	8·67
Elvington	3·50	12·51
Franceys	3·92	7·88
Gatooma (Railway)	3·38	16·74
Gatooma	3·55	16·68
Giant Mine	2·61	—
Gowerlands	3·80	12·94
Hallingbury	1·79	11·22
Hartley (Railway)	1·56	—
"Jenkinstown"	3·60	11·48
Makwiro	2·26	9·35
M'pofha Farm	4·02	8·30
Norton Siding	1·04	—
Shagari	1·52	9·78
"Stoneygate"	2·09	10·95
Lomagundi—		
Banket Junction (Railway)	3·15	7·69
Darwendale	6·41	8·22
Duxbury Farm	2·24	9·50
Eldorado Mine	3·76	7·28
,, (Railway)	4·66	—
Golden Kopje Mine	—	—
Kanyemba	—	—
Lone Cow Estate	4·26	8·76
Longmead	2·25	7·78
Palm Tree Farm	2·67	6·07
Sinoia	3·31	8·60
Sipolilo	4·47	7·80
Umvukwe Ranche	3·21	9·82
Makoni—		
Chimbi Source	5·70	6·85
Eagle's Nest	4·16	8·31
Ellavale	3·69	15·44
Inyanga	2·84	8·50
Inyazura	4·13	16·58
Mona	4·87	6·55
Monte Cassino Mission	3·44	7·10
Odzi (Railway)	1·72	—
River Junction	—	—
Rusape (Railway)	3·40	—
Springs	3·22	11·15
St. Trias' Hill	2·23	11·70
York Farm	4·19	11·43
Mangwendi—		
Bonongwe...	—	—
Glen Somerset	4·14	6·43

RAINFALL—(*Continued*).

STATION	November	December
MASHONALAND—(Continued)		
Mangwendi (Continued)		
Land Settlement Farm	2·67	9·47
Macheke (Railway)	2·91	4·69
Marandellas	—	—
Marandellas (Railway)	1·91	—
Mrewa	—	—
Mtoko	4·11	9·61
Rusawi Outspan	1·49	10·27
Selous Nek	2·81	9·17
Theydon	3·44	10·94
Tweedjan	1·79	13·24
Mazoe—		
Avonduur	1·99	3·90
Bindura (Railway)	1·85	—
Bindura	2·80	9·72
Ceres	3·27	8·26
Chipoli	3·58	7·37
Claverhill	2·62	10·93
Darwin	1·90	12·78
Dunmaglas	1·86	8·71
Fairview	1·79	10·22
Jumbo	2·80	—
Kilmer	1·56	6·79
Laguaha	2·39	9·02
Lowdale	1·49	7·52
Mazoe	2·42	—
Mguta Valley	1·86	8·98
Omeath	3·03	5·94
Ruia	2·29	7·92
Shamva	2·63	7·11
,, Mine	2·88	8·41
Sunnyside	2·47	10·80
Stanley Kop	4·31	10·19
Teign	3·02	6·65
Umvukwe Flats	5·34	6·23
Melsetter—		
Chikore	3·19	16·03
Chipinga	1·86	15·95
Helvetia	1·53	14·32
Melsetter	2·21	13·75
Mount Selinda	2·38	—
Mutambara Mission	1·88	11·66
Pasture	2·65	8·38
Tom's Hope	2·32	15·88
Vermont	1·27	—
Salisbury—		
Avondale	0·88	7·28
Brookmead	6·29	10·83
Chishawasha	2·32	11·79
Cleveland Reservoir	2·48	7·70
Forest Nursery	1·98	—

RAINFALL *(Continued).*

STATION	November	December
MASHONALAND—(Continued)		
Salisbury (Continued)		
Glenara	1·59	10·73
Goromonzi	2·52	12·09
Gwibi	2·14	11·39
Lilfordia	3·09	7·43
Meadows	—	—
Salisbury (Gaol)	0·92	6·81
,, (Agricultural Department Offices)	1·31	8·36
,, (Club)	1·18	7·20
,, (Railway)	0·99	—
Sebastopol	3·44	9·53
Selby	2·21	6·96
Stapleford	—	—
Westridge	1·03	8·21
Umtali—		
Chiconga's Location	2·15	12·11
Odzani	2·29	6·52
Penhalonga	2·51	7·18
Premier Estate	1·81	9·34
Stralsund	1·68	7·63
Summerfield	2·80	10·40
Umtali (School)	1·85	—
,, (Railway)	2·05	—
Utopia	1·25	12·66
Victoria—		
Chibi	2·69	16·22
Chilimanzi	3·37	12·55
Chingombe	3·44	—
Chiredzi Ranche, Ndanga	2·20	—
Clipsham	3·62	15·60
Eythorne	2·51	15·68
Gokomere	5·83	12·48
Gutu	2·87	13·61
Hanyanya (Bikita)	2·87	—
Makorsi River Ranche	0·74	20·65
Marah Ranche	6·15	—
Marthadale	2·28	15·43
Morgenster	1·73	17·98
Ndanga	2·19	16·14
Noeldale	1·85	10·14
Pamushana	1·86	14·58
Silver Oaks	1·49	15·83
Victoria	1·90	14·88
MATABELELAND:		
Belingwe—		
Albany	3·23	7·98
Anglo-French Block	—	—
Filabusi	2·41	13·02
Fort Rixon	—	—
Infiningwe	3·27	—

RAINFALL (*Continued*).

Station	November	December
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RAINFALL *(Continued)*

Station	November	December
MATABELELAND—(Continued)		
Gwelo—		
Globe and Phœnix (Railway)	4·33	—
Grafton	1·36	17·09
Gwelo (Gaol)	3·98	14·88
Gwelo (Railway)	3·80	—
Lalapanzi (Railway)	2·89	20·69
Lalapanzi	3·69	—
Lochiel	—	—
Lower Gwelo	3·78	15·70
Que Que	4·82	14·28
Rhodesdale Estate	3·62	14·28
Selukwe (Railway)	3·12	—
Shawlands	—	—
Sheltered Vale	2·64	12·63
Sikombela Farm	2·11	17·34
Umhlali Farm	2·66	—
Mafungabusi—		
Gokwe	3·93	15·15
Inyoka	2·44	13·70
Mangwe—		
Empandeni	2·59	19·96
Garth	3·87	16·08
Tuli—		
Lamulas	0·62	—
Langalanga	1·07	—
Makalali	2·39	—
Manantji	0·76	—
Manyoni	—	—
Mazunga	2·03	12·55
M'pande	0·69	—
Tuli	2·05	10·42
Wankie—		
Guyo	1·29	14·88
Malindi (Railway)	2·07	—
Victoria Falls	1·67	—
Victoria Falls (Railway)	1·41	—
Wankie (Railway)	1·03	—
Wankie Hospital	1·25	13·37

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1915		
			February	March	April
Bindura	Thurlow's Hotel	A. M. Robb	..	13	..
Charter—Mgezi	Beatrice Mine	W. Krienke	24	31	28
Central	Umvuma..	———	26	26	30
Enterprise	Arcturus Hotel	J. Watson	10	10	14
Felixburg	Umvuma	E. C. Boardman	27	27	24
Figtree Branch, R.L. and F.A.	Figtree Hotel	A. Curtis	..	..	..
Gatooma	Gatooma	———	20	20	17
Gazaland	Chipinga	W. Wood	..	..	29
Greystone	Roodeheuvel, Shangani	J. W. Spencer	13	13	10
Hartley	Hartley	H. Savory	6	6	10
Headlands	Headlands	H. Barnes Pope	..	..	..
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. W. Twilley	13	13	10
Insiza—Shangani	Insiza Station Hotel	N. C. St. J. Brislin	..	6	..
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	13	13	10
Lalapanzi and Iron Mine Hill	Lalapanzi	Cyril Allen	..	..	..
Lomagundi	Sinoia	W. Abbott	20	20	17
Macheke	Macheke	H. H. Kidson	6	6	3
Makwiro	Makwiro	F. R. McLellan	19	19	16
Marandellas	Marandellas Farmers' Hall	E. P. de Kock	6	6	3
Mangwendi	Fixed every meeting	Luke Green	..	3	..
Makoni	Rusape	———	6	6	3
Marula	Marula Siding	Mac. W. Ingram	27	27	24
Mashonaland	Commercial Hotel, Salisbury	W. H. Williamson	13	13	10
Matopo Branch, R.L. and F.A.	Malundi Hotel	W. Bathurst	..	..	..
Mazoe	Glendale Siding	R. Newett	10	10	14
Melsetter (North)	Various farms	Rev. R. Wodehouse	6	..	..
Midlands	Gwelo	C. H. B. Mercer	13	13	10
Northern Umtali	Farm "Summerfield"	R. V. H. Blurton	6	..	..
Norton and District	Norton Siding and various farms	C. E. Idle	..	26	..
Que Que	Globe and Phœnix Hotel	———	20	20	17
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	26	26	30
Shamva	Shamva	J. M. Moubray	No	dates fixed	
Southern Insiza	Peggy Hotel, Insiza	W. J. B. Harris	7	7	4
Selukwe	Selukwe	F. S. Clark	No	dates fixed	
Somabula and Shangani Flats	Fairview	G. B. Botha	No	dates fixed	
Umvukwe	Various farms	———	No	dates fixed	
Umtali	Christmas Pass Hotel	J. S. Holland	6	6	3
Victoria	Victoria	H. S. Hoatson	..	..	..
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	13	13	10

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a $\frac{1}{4}$ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, in

which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply. *Rhodesia Agricultural Journal*, February, 1914.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of

good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—
Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases

where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation.

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil

Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Napier's Fodder.

Arrangements are being made to supply Napier's fodder in lots not exceeding 200 rooted slips per applicant. Price, 5s. per 100, delivery to commence towards the end of February. Applications, together with remittance and full particulars regarding forwarding, should be addressed to the Agriculturist and Botanist, Salisbury.

Forestry—Sale of Trees

The undermentioned varieties of trees will be available for sale as from December and onwards:—

Casuarina leptoclada—Beefwood.
Cedrela toona—Indian toona.
Callitris calcarata—Cypress pine.
Callitris robusta—Murray pine.
Cupressus arizonica—Arizona cypress.
    do. horizontalis—Common cypress.
    do. pyramidalis—Common pyramidal cypress.
    do. lusitanica—Portuguese cypress.
    do. torulosa—Himalayan cypress.

Dalbergia sissoo—Indian sissoo.
Eucalyptus amygdalina—Peppermint gum.
do. botryoides—Bastard mahogany gum.
do. calophylla—Calophylla gum.
do. citriodora—Lemon-scented gum.
do. corynocalyx—Sugar gum.
do. longifolia—Woolly butt gum.
do. microtheca—Coolibah gum.
do. microcorys—Tallow wood gum.
do. paniculata—Red ironbark gum.
do. resinifera—Red mahogany gum.
do. robusta—Swamp mahogany.
do. rostrata—Rostrata gum.
do. saligna—Saligna gum.
do. tereticornis—Red gum.
do. siderophloia—Broad leaved ironbark.
do. sieberiana—Mountain ash gum.
Grevillea robusta—Silk oak.
Jacaranda mimosæfolia—Jacaranda.
Pinus densiflora—Akamatsu pine.
do. halepensis—Aleppo pine.
do. longifolia—Cheer pine.
Thuja orientalis—Arbor vitæ.
do. gigantea—Large arbor vitæ.

Prices are as follows:—

Orders up to 1,000, at 8s. 4d. per 100, tins included.

Orders from 1,000 to 5,000, at 6s. per 100, tins to be provided or returned.

Orders of over 5,000, at 5s. per 100, tins to be provided or returned.

All prices are f.o.r. Salisbury, and trees are in tins weighing about 25lbs. each. There are also a limited number of larger trees, 4 in a tin, at 3d. per tree. Ornamental shrubs, 6d. and 1s. each, generally 4 in a tin. Dalbergia sissoo seed at 6d. per oz. Foureroya gigantea (Mauritius hemp) bulbels, at 1s. per 100; Sisal hemp bulbels, at 3s. per 100; Paspalum, 5s. per 1,000.

Applications, together with remittance and full particulars regarding forwarding, should be addressed to the Agriculturist and Botanist, Department of Agriculture, Salisbury.

Farming Calendar.

February.

The aim of the Department of Agriculture in issuing this calendar is to provide farmers, and more especially newcomers, with guidance as to seasonable operations.

It is, of course, realised that in so large a territory as Southern Rhodesia appropriate dates for certain operations vary somewhat, and the individual farmer must, therefore, adapt to his own conditions the advice here given. To provide in handy form specific details applicable to every district is manifestly impossible; similarly, seasons are known to vary, and the advice here tendered is for normal conditions. Allowance must be made, therefore, if the season is advanced or backward. Subject to these appropriate corrections, the calendar will be found to be a guide for average conditions.

The information tendered is not to be regarded as applicable in every instance and necessarily the best or only course, for at this stage in our agricultural history it is only possible to indicate in a general way what practices have proved successful in our experience.

BEE-KEEPING.

Where there is a superabundance of drones, these may be got rid of by placing a drone trap at the entrance of the hive. When working with shallow frames, instead of with sections, for extracting purposes, full sheets of drone foundation are the most suitable. These, when filled, should be uncapped with a sharp, stiff knife, which makes superior work when kept hot in a large saucepan of boiling water. The uncapped combs are now ready to undergo the operation of extracting. The resultant honey should then be run into a honey ripener and allowed to stand, covered with muslin, in a warm room for ten days. It can then be drawn off to within three inches of the bottom into the recognised 1lb. screw-top honey bottles. Save the cappings from these combs, as they are the purest bees-wax. Study and make notes for future reference of the flowers which are visited by bees in your district. When increase of stocks is desired, artificial swarms can now be made, but in this operation it is important to give as little smoke as possible, as the queen, which must be found, will the more likely be seen on a central frame of comb. The moist weather is favourable to the development of the wax moth, especially in weak stocks. Combs thus affected should be fumigated in a closed receptacle with burning sulphur.

CROPS.

During this month the farmer's energies will be concentrated on keeping the lands thoroughly clean, and if this is done effectively now no further serious damage from weeds need be feared.

Most summer crops will be in the ground. Maize for ensilage may still be sown early this month, also catch crops of buckwheat and teff for hay and seed.

The main maize crop should be cleared of suckers, which can be fed to the stock. The most vigorous plants should be marked for seed selection, by cutting the stalk above the cob, and the date of tasselling should be noted both in the case of the main crop and of the ensilage crop. In the case of excessive moisture, as during the present season, the use of the wing shovel plough is strongly recommended.

Monkey nuts should not be cultivated after the period of flowering, which usually occurs early in February.

Hay making should start in February, if weather conditions allow. The sooner the veld is cut for hay during these months the better the product obtained.

Land for winter crops of oats and wheat should now be got ready, as weather circumstances permit.

Napier's fodder slips planted early in the season can now be divided.

DECIDUOUS TREES.

This is the time to carry out summer pruning, after harvesting the crop, and when the flow of sap begins to become sluggish.

ENTOMOLOGICAL.

Maize.—The first brood of the stalk borer matures this month, and the young of the second brood may be found amongst the younger leaves. Certain caterpillars are sometimes troublesome—See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912.

Tobacco.—Stem borer, leaf miner and budworms are the chief pests likely to be troublesome—See "Handbook of Tobacco Culture," published by the Department of Agriculture, pp. 71-99.

Potato.—Ladybirds and tuber moth may call for attention; the latter, when very bad, sometimes causes considerable wilting of the crop besides attacking the tubers—See *Agricultural Journal*, October, 1913, and February, 1910.

Cabbage Family.—All members of the family are liable to the attack of sawfly and webworm during February—See *Agricultural Journal*, February, 1914, April, 1910, and April, 1911.

Beans and Cowpeas.—Suffer chiefly from stem maggot and blister beetles, which destroy the blossoms. The latter must be collected by hand. The former is dealt with in the number of this *Journal* for April, 1913.

Melon Family.—The most important pest is the melon fly, which "stings" the fruit of all species of gourds. At present no remedy is known except collecting and destroying the infested fruit early in the season. Aphis on the leaves and shoots may be destroyed by careful spraying with tobacco wash or paraffin emulsion.

Mangolds and Beets.—Are frequently defoliated by caterpillars. Spray with an arsenical wash.

Citrus Trees.—The chief pest requiring attention during February is citrus codling. The infested fruit should be gathered and destroyed regularly.

Deciduous Fruits.—Apple, pear and late peaches suffer chiefly from fruit moths, which puncture the fruit. No remedy is known except netting the trees.

Fig.—The fruit is liable to the attack of the fig weevil. Infested fruit should be collected and destroyed. The borer in the stem may be killed with a little carbon disulphide.

FLOWER GARDEN.

During this month the flower garden is gradually approaching perfection, and nearly all plants are in bloom. If these are constantly plucked the yield will be increased, and, except where required for seed, all flowers should be removed as they fade, for seeding shortens the life of many plants. All runners and creepers should have constant attention, and be tied up and trained. Dahlias in more exposed positions should be carefully tied to their stakes, as they now become top-heavy with the weight of their blooms. Palms in the house and conservatory will benefit much if occasionally put out in the rain.

FORESTRY.

Complete planting out of ever-greens. Sow in nursery seeds of slow growing species such as cypress, pines, etc. All planting should be completed this month, in the early part if possible.

GENERAL.

This is a busy time for the farmer. Weeds will be very much in evidence and difficulty will be experienced in keeping them under. Stock will have fully recovered their condition, but ticks will be troublesome. The dipping tanks must be fully utilised now.

POULTRY.

Do not attempt to make your birds lay during the moult, and, if possible, keep them dry. As the feathers are being cast, food of a cooling rather than a stimulating nature should be given. Do not have any superfluous fat on your moulting birds or they will probably stick in the moult. Give all birds a plentiful supply of green food. Keep your late hatched birds growing as long as possible. The early hatched pullets should be giving a good supply of eggs now.

STOCK.

Cattle.—Grass throughout the country will now be at its best, and no anxiety need be felt about feed. In the case of milking cows which have been fed during the earlier rainy months, a little crushed and soaked mealies, or something of that kind, may still be given at milking times, if only to bring the cows quietly to their places for milking. The importance of a clean, light, airy and well-drained shelter for calves cannot be over-estimated. Calves up to three or four months old do not require a great deal of exercise, and are far better, on wet days, if left in a dry shed with a little sweet hay to eat than if turned out in the rain. A few hours' exercise on bright days in short grass is all they require. Vigilance in keeping down ticks must not be relaxed. The above remarks apply more particularly to milking herds and to cattle which are kraaled. Cattle running at large need little attention beyond dipping, and, if calves are not desired from November to March, the bulls must now be taken out of the herd.

Sheep.—With all sheep the vleis and low-lying ground must be avoided. Sheep sheds should be airy, dry and clean. If grass seeds are troublesome to woolled sheep, an area should be mown for them, or when the rain begins to slacken off they may be shorn. If wire worm is troublesome, dose and move to fresh grazing ground and kraals.

TOBACCO.

The curing should be well on now, if any tobacco was transplanted in November. This will be a busy season until the curing is finished; however, one or two good plough boys with all the spare oxen should be breaking land for the next season's crop, turning under all vegetable matter.

VEGETABLE GARDEN.

Potatoes should receive attention and be carefully ridged up, and care taken that the stalks are not buried. Seeds for winter crops should be sown, such as beet, Brussels sprouts, cabbage, carrots, beans, peas, onions, turnips, tomatoes, etc. Vegetables planted out during this month might be placed a little closer together than usual, as watering may have to be resorted to before they mature.

VETERINARY.

This is a bad month for horsesickness. Redwater and gallsickness in cattle occur all the year round, but the summer months, when ticks are active, is the worst time. Three day sickness in cattle may now be looked for. Trypanosomiasis is a summer disease. Blue tongue is somewhat similar to horse-sickness, and February is a bad month. The disease has so far only been found in imported merinos, but it spreads from these to indigenous sheep. After twelve months in the Territory, sheep do not contract the disease. The first symptom is laminitis, the second a protruding blue tongue. White scour may be prevalent now, but dipping is eradicating the disease.

WEATHER.

This is generally the wettest month of the year, with marked differences of from 10 inches to 15 inches on the eastern mountain ranges, 7½ inches over Mashonaland, 4 inches to 6 inches in Matabeleland, and least, but still some, rains in the Limpopo Valley. The rains may be expected to decrease in intensity after the middle of the month if the season is normal.

March.

BEE-KEEPING.

Remove and extract honey from shallow frames. Section crates should now be removed from hives, but if the honey flow has not ceased, allow them to remain till the end of next month. Take care of your honey for sale, and clean sections fit for competition at shows, storing them in a dark, dry, warm cupboard, if possible free from ants and mice. Examine roofs of hives, and where rains have entered give one coat of paint, and while wet, stretch loosely canvas or muslin over outside of roof, then dab on with brush two more coats. This plan is very effectual. Wash all bottles for the reception of honey, and stand upside down to drain dry.

CITRUS FRUITS.

Crops grown in the citrus groves as a green manure should now be ploughed in, but whether such a crop has been grown or not the annual ploughing between the trees should now take place.

CROPS.

For general cultural treatment see February notes. Rape and kale for autumn feeding may be sown during the latter half of this month. Hay-making can continue. Land for winter crops of oats and wheat should now be ready. The division of Napier's fodder slips can be continued up to the end of this month.

ENTOMOLOGICAL.

Maize.—The stalk borers of the second brood will be found freely in the stalks, but nothing can be done at this stage. Caterpillars may attack the crop during this month, usually as a sequence to cultivation, after the weeds have been allowed to get too far ahead. The caterpillars attack the crop on account of their food being suddenly destroyed.—See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912.

Tobacco.—The crop will by this time have mostly outgrown insect injury, but any plants still infested with stem borer should be removed and burned. Leaf miner will be still in evidence, and budworms may put in an appearance.—See "Handbook of Tobacco Culture," published by the Agricultural Department, pp. 71-90.

Potato.—Ladybirds may be still injurious.—See *Agricultural Journal*, October, 1913. Careful hilling should be attended to on account of the tuber moth.—See *Agricultural Journal*, February, 1910.

Cabbage Family.—Sawfly.—See *Agricultural Journal*, April, 1910, and April, 1911. Will probably be less injurious by this time. Cabbage louse may be on the increase. Very thorough spraying with tobacco wash and soap is of value when the plants are young.

Beans and Cowpeas.—The most obvious enemies are the blister beetles, which destroy the blossoms. These can only be destroyed by hand. Stem maggot continues injurious, causing dropping of leaves on the larger plants, but little can be done at this stage.

Melon Family.—Plants of this family are subject to the attack of melon fly and aphis. Careful spraying with tobacco wash or paraffin emulsion is of value against the latter.

Sweet Potato.—Hawk moth caterpillars occasionally appear in countless thousands and defoliate the crop. Immediate spraying with an arsenical wash is called for when the insects first appear.—See *Agricultural Journal*, June, 1912.

Citrus Trees.—Attention should be constantly given to the systematic collection and destruction of infested fruit, to keep down the citrus codling.

Deciduous Trees.—But little damage from insects is likely to occur to these fruits during March.

Fig.—Fig weevil still calls for attention in collecting and destroying the infested fruits.

FLOWER GARDEN.

During this month the garden should be seen at its perfection, and, owing to our rains, requires a great deal of attention in order to keep the soil free from weeds and caking. Drainage should also be looked to, in order to avoid plants being swamped or washed away. Dahlias and carnations should now be in their heaviest bloom, and will require tying up, and the dying blooms should be removed, in order to prolong their flowering period. Plants for winter flowering should now be coming on and planted out. Cuttings of carnations may now be made, and should be picked from the choicest plants, and taken from stems which have borne the finest blooms. The cuttings should be placed in boxes containing sand, and kept in a moist condition in a warm position sheltered from the winds. These should be ready for planting out in about two months, and bloom in three. Carnations, verbena, antirrhinum, penstemon, pansy, dianthus, phlox, calliopsis and escholtzia may be sown for early blooming next spring.

FORESTRY.

If necessary, cultivate between the rows of trees planted out in the previous months. Plough any fire lines that are necessary and break up any new ground that will be required for next season's planting. Remember that the roots of trees penetrate deeply into the ground, and therefore plough as deeply as possible. Where black wattle thrives, sow seed this month, after well soaking.

GENERAL.

At this time the condition of stock on the veld is good—perhaps at their best. It is well, however, to look ahead and make ready for the coming winter by the provision of winter feed in such forms as veld hay, silage, baled fodder from maize, manna, oats, teff, velvet beans, and the like, and by taking steps to ensure that water will be available for the stock in winter as near their grazing ground as may be.

POULTRY.

An iron tonic will be found beneficial to any birds that are not moulting satisfactorily. If the new feathers are forming, give a slight increase in food containing a little animal matter. Flowers of sulphur in the soft food will help to keep the birds in condition. Continue to give abundance of green food.

STOCK.

Cattle.—The precautions recommended for February apply equally to March, as far as the immediate care of cattle is concerned. Weather permitting, no opportunity should be lost of getting in some good sweet hay before the grass is too old. Arrangements should be completed for storing such silage as it is proposed to make, so that the crops reserved for this purpose may be harvested immediately they are fit.

Sheep.—The same precautions as are recommended for February should be taken, but as one may expect less rain, conditions will probably be more favourable. If late winter lambs are not desired, the rams should be removed from the flock accordingly.

TOBACCO.

The tobacco set out about Christmas time should be coming to maturity now, and the crop, if early and a good one, should be all reaped by the end of April.

VEGETABLE GARDEN.

Tomatoes, peas and beans should be in full bearing, and should be staked and tied. Weeding and cultivation should be extensively carried out. Seeds for late winter crops—beans, cabbage, cauliflower, peas, radish, turnips, spinach and beet—should be sown.

VETERINARY.

Horsesickness is now prevalent. Redwater and gallsickness occur in cattle all the year round, but the worst time is the summer, when ticks are numerous. Trypanosomiasis is a summer disease. Blue tongue may now be expected.

WEATHER.

Rains may be looked for in considerable quantity, though less than in previous months, 5 inches in Mashonaland and 3 inches in Matabeleland being normal, with as usual more on the eastern frontier. No useful rain need be reckoned upon after the end of this month, except on the eastern border, but the rainy season tapers off in an irregular and often erratic manner and without certainty.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

No. 2. The Possibilities of Rhodesia as a Citrus Growing Country, by R. McIlwaine, M.A., LL.B.
No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
No. 62. Services of Agricultural Engineer.
No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.
No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
No. 94. Second Report on Experiments, by J. H. Hampton.
No. 125. Subterranean Water, by W. M. Watt.
No. 137. Drainage for Irrigated and Swampy Land, by W. M. Watt.
No. 153. Citrus Fruit Trees—From Seed to Grove.
No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.
No. 156. Elephant Grass or Napier's Fodder, by J. A. T. Walters, B.A.
No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.
No. 164. Citrus Fruits in Rhodesia—Suggestions as to where to Plant, by C. E. Farmer.
No. 166. Rhodesian Citrus Fruits—Exportation to London.
No. 173. Citrus Fruits : Cultivation and Pruning, by C. E. Farmer.
No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.
No. 182 Some Citrus Growing Experiences in Rhodesia, by R. McIlwaine, M.A., LL.B.
No. 185. Citrus Fruits—The Preparation of Oranges for Market, by C. E. Farmer.
No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.
No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.
No. —. Orange and Lemon Growing in Southern Rhodesia, by R. McIlwaine.
Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
No. 106. Cultivation and Preparation of Ginger.
No. 126. Turkish Tobacco.
No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.
No. 138. Tobacco Culture (Virginia)—Harvesting and Curing.
No. 162. Rhodesian Maize : The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.
No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.
No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.

No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.
No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.
No. 179. Buckwheat, by H. G. Mundy, F.L.S.
No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.
No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.
No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.
No. 194. Rye, by J. A. T. Walters, B.A.
No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 58. Onion Thrips, by R. W. Jack, F.E.S.
No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.
No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.
No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.
No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.
No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.
No. 147. Root Gallworn, by R. W. Jack, F.E.S.
No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.
No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.
No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.
No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.
No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.
No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.
No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.
No. 197. Chafer Beetles, by R. W. Jack, F.E.S

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.
No. 53. Animals Diseases Consolidation Ordinance, 1904.
No. 77. Animals Diseases Amending Ordinance, 1911.
No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.
No. 95. Oestrus-ovis in Sheep, by Alec King.
No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.
No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.
No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.
No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.
No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.
No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.
Conditions under which Government Veterinary Surgeons' Services are available to the public.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.
No. 123. Feeding and Care of Imported Bulls, by R. C. Simmons.
No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.
No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.
No. 163. Feeding and Care of Imported Cattle, by R. C. Simmons.
No. 167. The Construction of Dipping Tanks for Cattle.
No. 169. The Breeding and Feeding of Pigs for Bacon Factory Purposes, by R. C. Simmons.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.
No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.
No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.
No. 134. Plans and Specifications for Flue Curing Tobacco Barns.
No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.
No. 149. Dry Season and Droughts in Rhodesia, by Rev. E. Goetz, S.J.
No. 150. Dry Season and Droughts in Rhodesia, by the Rev. E. Goetz, S.J.
No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.
No. 157. Hints on Brickmaking, by G. T. Dyke.
No. 159. Gwelo Creamery: Hints and Suggestions to Farmers, by W. G. Elliott.
No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.
No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.
No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.
No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.
No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.
No. 199. Eucalypts for the Farm, by J. J. Boocock.
Malarial Fever: How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.
The Prevention and Treatment of Blackwater Fever, by Dr. A. M. Fleming.
Malaria: its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.
Game Law: Summary of.
Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc.

HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS WANTED.

L. R. H.—As farm manager or assistant. Thorough knowledge of agriculture, etc.; also dairying and cattle; practical knowledge of most farm work and well up in oil engines, etc. State salary.

J. L. D.—Scotsman (unmarried) as farm manager or such like; thorough experience of general agriculture, pure-bred and commercial stock; knowledge of building and concrete work; can keep in repair all farm implements. Satisfactory references from present and former employers.

W. S.—Colonial requires responsible position on farm; seven years' experience; thoroughly understands cattle, small stock and grain crops. Percentage of crops, etc., or salary.

C. H. C.—Late foreman of Government House, Bulawayo; well up in general farming, market gardening, fruit and forestry.

C. B.—As general assistant; good knowledge of brickmaking and bricklaying; experience in all crops, including cattle, also handling of cattle.

V. T.—As tobacco man; experience in Java, United States and Nyasaland.

R. P.—As manager of a farm. Experienced in general farming, market gardening and fruit growing.

P. G. C.—As manager of farm. Experience in all branches of farm work.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:*—

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:*—

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed

by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 24 of 1914.] [14th January, 1914.

(As amended by Nos. 207 and 395 of 1914.)

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 82, 129, 143, 258, 297 and 326 of 1913, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas :—

(2) NATIVE DISTRICT OF SALISBURY.

(a) *Areas of Infection.*

(1) Hatfield Estate and Hatfield Plots.
(2) Salisbury Commonage.
(3) M.T.C., Gallagher's Lease and Makabusi farms.
(4) Epworth, Adelaide and Glenwood farms.

(b) *Guard Areas.*

(1) The farms Haydon and Good Hope.

(2) The farms Warren, Lochinvar, the eastern sub-division of Willowvale, Makabusi Outspan, Ardbennie Township, Waterfall, Hopley, Saturday Retreat, Odar Outspan, Stoneridge, Spreckley, Eyrecourt, Eyerston, Retreat, Prospect, Bunker's Hill, Adair, Boutelle, Godavery, Twentydales, Deanesbrook, Nalire Native Reserve, Galway Estate, Mayfair, Sebastopol, Dispute, Caledonia, Donnybrook, Greengrove, Ventersburg, Lorelei, Letombo Reserve and Greendale.

(3) NATIVE DISTRICT OF UMTALI.

(a) *Areas of Infection.*

The farms N'odzi and Nyagari, and the Penhalonga Valley.

(b) *Guard Area.*

The farms Mabonda, Mountain Home, Umtali Mission, Imbeza Valley, Duris and Forest Farm.

No. 239 of 1914.] [4th June, 1914.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard area in the native district of Salisbury.

(a) *Area of Infection.*

The farm Bluff Hill.

(b) *Guard Area.*

The farms Crowborough, Parkridge, Fontainebleau, Reserve, Tynwald, Mabel Reign, Avondale, Gillingham, Rainham, Stamford, Homefield, Dovedale, Stapleford, Glen Lussa, St. Marnocks, Kinvarra, Selby, Mount Hampden, Mount Hampden Reserve, Bendaugh, Glenara, Eskbank, Oldbury, Komani, Hinricksen, Thorn Park, Zizalisari Outspan, Mount Pleasant, Teviotdale, Vainona, Pomona.

No. 449 of 1914.] [22nd October, 1914.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Tynwald, in the native district of Salisbury, to be an area of infection.

No. 506 of 1914.] [10th December, 1914.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of a destructive disease, to wit, African Coast Fever, on the farm Nooitgedacht, in the native district of Melsetter, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the above-mentioned farm to be an area actively infected with African Coast Fever for the purposes of the said Ordinance.

No. 507 of 1914.] [10th December, 1914.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard area in the native district of Melsetter :—

(a) *Area of Infection.*

The farm Nooitgedacht.

(b) *Guard Area.*

An area bounded by and including the following farms :—Joppa, Merrywater, Heathfield, Albany, Uitkyk, Knutsford, Ferncreek, Vermont, Wolfscrag, Enhock, Woodstock, Landsdown, Kennilworth, Groenvlei, Vleiplaats, Waterfall, Fortuna and Outspan.

No. 443 of 1914.] [15th October, 1914.

ENZOOTIC ABORTION.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amending Ordinance, 1911," I do hereby declare the farm Gatzi, in the native district of Marandellas, to be actively infected with the disease known as enzootic abortion, for the purposes of the said Ordinances.

No. 498 of 1914.] [3rd December, 1914.

ENZOOTIC ABORTION.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare the following area to be actively infected with the disease known as enzootic abortion for the purposes of the said Ordinance :—

"Approximately 7,000 morgen of land, bounded on the west by the eastern boundary of the Sipolilo Reserve, on the north by unsurveyed land, on the east by the western boundaries of the farms Pembi Junction and Galloway, and on the south by the northern boundaries of the farms Disi and Marwi and a line taken direct from the eastern beacon of the latter farm to the north-western beacon of Stockwell."

No. 381 of 1914.] [3rd September, 1914.

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of this Notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe and Gwanda.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 527 of 1914.] [31st December, 1914.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the 1st day of January, 1915, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including the Salisbury native district bounded by and including the following farms :—Lilfordia, Saffron Walden, Kilworth, Porta, Outspan, Clements' Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Odar Outspan, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Caledonia, Hartmans, Chishawasha, Glenlorne, Borrowdale, sections 4 and 1, The Willesden, Lowdale, Ingleborough, Mguta, Great B, Umsasa, Springvale, Passaford, Spa, Fairview, Nalire, Penrose.

No. 505 of 1914.] [10th December, 1914.

CLOSING OF GATES ON ROADS, ETC.

UNDER and by virtue of the powers vested in me by section 26 of the "Fencing Ordinance, 1904," I do hereby provide that travellers passing through a gate erected on a public or private road in terms of section 25 of the said Ordinance, and omitting to close such gate after having passed through, shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

    (1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

    (2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

    (3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

    (4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address..
2. Number and Class of Cattle to be imported...
3. Area or Farm and District where Cattle are at present located..............

   ....

4. Area or Farm and District to which Cattle are to be moved.................

   ....

Applicant's Signature..

Date..................................
Application..........................
Permit No...........................

ANNEXURE "B."

I, ... residing on the farm .... in the district of .... do solemnly and sincerely declare that the .... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals .... Bulls .... Heifers ....
Breed ....

Seller's Name and Address ....
....

Purchaser's Name ....
Place in Southern Rhodesia to which animals are being sent
....

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at .... on this .... day of................ before me,

....

Resident Magistrate for the District of ....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London

Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart

Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, ETC.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries :—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals, nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date................................., 19...
Place ....

....
Signature of
Government Veterinary Surgeon.

Number and general description of animals:
...............Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent:

Owner's name and address: ....
....
....

Place in Southern Rhodesia to which it is desired to send the animals
....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at .... in the district of... .... in the............................ Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to...................................† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at...on this.............. day of...before me.

....

Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent..............................

Owner's name and address..

....

Place in Southern Rhodesia to which animals are being sent.......................

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the under-mentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.
Gwanda.
Plumtree.
Fort Rixon.
Belingwe.
Inyati.
Fort Usher.
Mphoeng's.
Holi.
Filabusi.
Gwaai.
Figtree.
Umvuma.
Que Que.

No. 375 of 1912.] [28th November, 1912.

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches: and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :
Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :
Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Open areas.

The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following areas in the Hartley district and the Sebungwe district until further notice.

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

Sebungwe District.—From the confluence of the Sengwe and Lutope Rivers up the Lutope to its headwaters, thence in a south-east and easterly direction following the southern edge of the escarpment, leaving Meare's farm to the south, to the Mafungabusi Peak, thence northwards along the escarpment to the Njelele River, and down that river to its confluence with the Sanyati River, thence northwards down the Sanyati River to its confluence with the Piriwiri River, thence direct in a north-westerly direction to Picaninyemba, and thence along the footpath to Nenyunka on the Sengwe River, thence southerly up the Sengwe River to its confluence with the Lutope.

Elephants, Hartley District.—Notice No. 168 of 1914 permits the shooting or capturing of elephants on or within five miles of the farm Walden, in the Hartley District, for a period of one year from 9th April, 1914.

The game specified may be shot in these open areas without a licence.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

No. 390 of 1912.] [19th December, 1912.

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds :—

(1) Great Locust Bird or White Stork (*Ciconia alba*);
(2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*);
(3) Small White Heron or Cattle Egret (*Bubulcus ibis*);
(4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 489 of 1914.] [26th November, 1914.

ABOLITION OF POUND AT IMPOFHOE.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that at the request of the Acting Civil Commissioner, Hartley, the pound on the farm Impofhoe, in the magisterial district of Hartley, established by Government Notice No. 44 of 1914, is hereby abolished as from 6th November, 1914.

No. 511 of 1914.] [17th December, 1914.

ESTABLISHMENT OF POUND AT WANKIE.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that, at the request of the Civil Commissioner, Bulawayo, a pound has been established at Wankie, in the magisterial district of Bulawayo, and that the said pound shall be available for the public as from the 1st January, 1915.

No. 528 of 1914.] [31st December, 1914.

ABOLITION OF POUNDS ALONG THE RAMAQUABANE RIVER.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that Government Notice No. 480 of 1914, establishing pounds at Mpinis, Madabis, Raditladis and Mphoengs, is hereby cancelled.

No. 529 of 1914.] [31st December, 1914.

ESTABLISHMENT OF POUND AT POLLOKSHIELDS, MAKWIRO.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that, at the request of the Civil Commissioner, Hartley, a pound has been established at Pollokshields, Makwiro, in the magisterial district of Hartley, and that the said pound will be available for public use from the 1st January, 1915.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits
Bread
Butter
Confectionery
Cigarettes
Dried & Bottled Fruits
Dried Meats
Eggs
Flour
Flowers
Honey
Jam
Plants
Poultry
Seeds
Sugar
Tobacco
Wool Samples

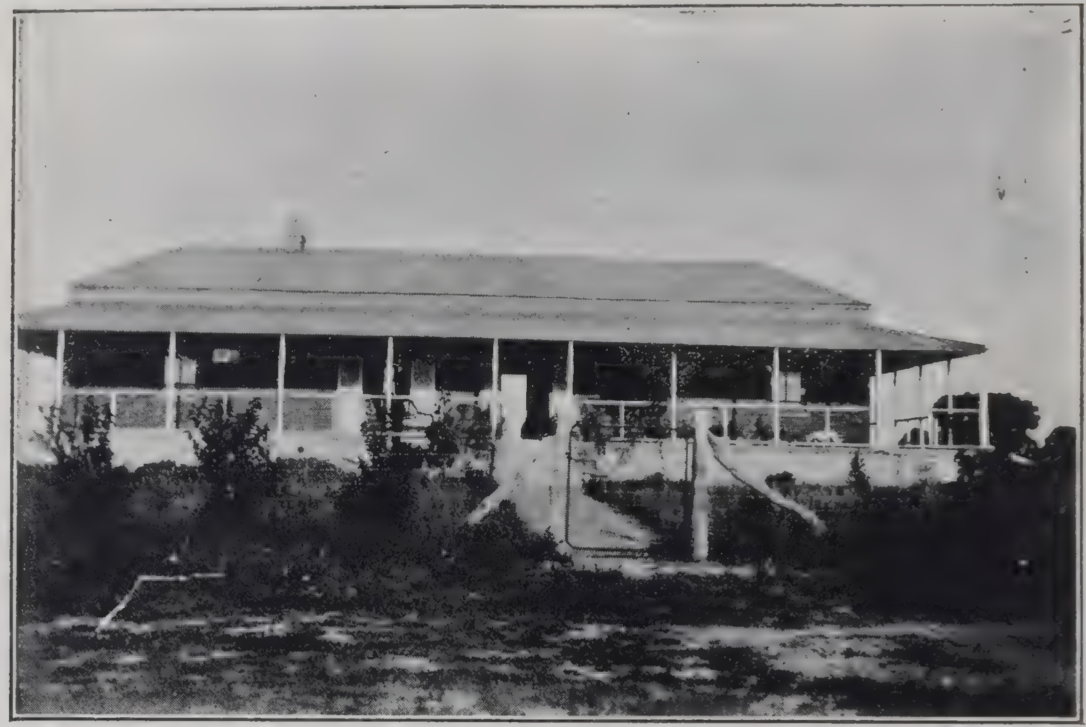
and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

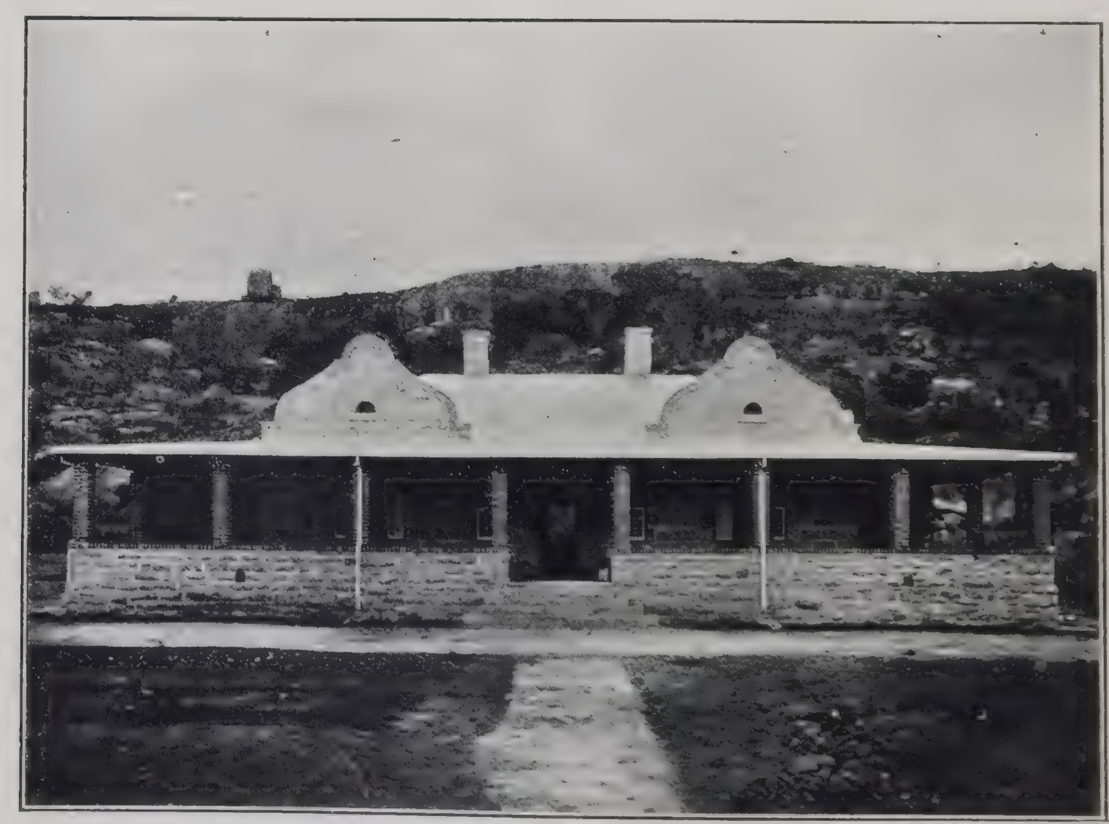
The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.



Homestead at Induna Estates, near Umvuma, the property of Brigadier General H. A. Tagart, D.S.O.



Architect, W. D'Arcy Cathcart, A.R.I.B.A.]

Homestead at Headlands Farm, Headlands, the property of Mr. B. E. V. Bernard.

Types of Rhodesian Farmhouses.

THE RHODESIA

Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

PUBLISHED BI-MONTHLY.

VOL. XII.—NO. 2.] APRIL, 1915. [5s. per annum.

Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

AGRICULTURAL UNION CONGRESS.—The Rhodesia Agricultural Union Congress will be held at Salisbury on the 21st April. The agenda, at the time of going to press, was not quite completed, but the following are some of the subjects to be discussed:—Mining laws, public outspans, land transfer, gallamziekte, branch railways, Bacon Factory, Gwelo Creamery, Herbage Preservation Ordinance, state of tobacco industry, export of slaughter cattle from Rhodesia to Transvaal, importation of cattle from Northern Rhodesia.

THE OIL FACTORY.—The British South Africa Company's Oil Factory, which is situated close to the Bacon Factory, at Salisbury, is now practically complete. The machinery has been installed, and the manager, Mr. V. C. Williamson, will take up his duties at the beginning of April. On and after 1st May next, the factory will be open for the receipt of oil nuts and seeds from farmers. The nuts and seeds must be properly bagged, the bags must be clearly marked with the owner's name or initials, and addressed to the Manager, the British South Africa Company's Oil Factory, Salisbury, to whom an advice must be sent, in advance, giving full particulars of the consignment.

The following prices will be paid by the factory as a start:—

Ground nuts—7s. 2d. per bag of 83 lbs. (shell not to exceed 30 per cent.).
Castor beans—1d. per lb.
Sunflower seed—¾d. per lb.
Linseed—2d. per lb.
Cotton seed—¾d. per lb.

delivered at the factory, Salisbury.

The above prices will be liable to fluctuation with market conditions, but should revised prices be subsequently decided upon, due notice will be given.

As regards freight, the Rhodesia Railways have agreed to convey castor beans, sunflower seeds, ground nuts (in shell) and linseed from all sections to Salisbury, when consigned to the Oil Factory, in full truck loads at owner's risk, station to station, at the special scale shewn on pages 107 and 108 of Goods Tariff Book No. 8. These rates vary from 2d. per ton per mile for distances 1 to 60 miles, to 1½d. per ton per mile for distances exceeding 200 miles, and are subject to a maximum charge of £3 per ton. Cotton seed is carried over the Rhodesia Railways at one-half of the 3rd class rate.

EXPORT OF MAIZE.—It is estimated that from 350,000 to 400,000 bags of maize will be available for export from Southern Rhodesia this season. In addition, about 50,000 bags will most likely be exported from Northern Rhodesia. The work of grading will be undertaken by the Government of Southern Rhodesia, and this year the bulk of the maize will be graded at the siding to which it is conveyed by the farmer, and not at Salisbury, as was done last year. This will enable farmers to avoid the consigning of moist or weevilly grain, and the consequent expense of the higher railage charges made on grain unfit for export. Although the price of maize on the European market is exceptionally high at present, it is feared that the accruing benefit will be largely discounted by the high freights now obtaining as a result of the war. We understand that representations on the subject of freights are being made to the principal steamship companies, and we can only hope that they will not be without effect by the time the export of maize is due to commence.

The following circular letter has been issued by the Farmers' Co-operative Society to members:—

"The business of exporting maize is one of enormous importance to this country, inasmuch that export is, as yet, the only means by which the producer can find an outlet for his surplus crop. Excellent facilities have been provided by the Beira and Mashonaland and Rhodesia Railways, and growers of maize now have the maize markets of the world open to them at export rates which compare favourably with any in the world.

Maize is a valuable oversea export, and is a source of profit to farmers that can be relied upon. This country is an ideal one for its production, and has a harvesting season that cannot be excelled by any maize growing country in the world. Maize of exceptionally good quality can be produced in large quantities, and, with excellent export facilities and a ready market in Europe at profitable rates, ought soon to become the leading source of revenue to the country.

Members are requested to carefully note the following:—

It is recommended that every member personally superintends the shelling of his maize, and rejects all damaged cobs. Such superintendence will pay.

Members should see that their maize is perfectly dry before bagging. Drying and rebagging is a costly job: and further, such maize loses the grade certificate and corresponding advantages.

A simple test. No maize is fit for bagging which shews the germ full and plump. It should be hollow and firm.

Only 2½ lbs. grain bags will be passed by the grader. All bags must be new.

The mouths of bags must be double sewn, with lugs, *i.e.*, the corners strongly fastened and left standing out. This facilitates handling, and loaders will not require to use hooks, which tear the bags and cause loss of weight.

The weighing of maize should be carefully carried out, and bags must weigh 200 lbs. net at time of shipment. Members are notified to fill to 205 lbs. gross per bag to allow for drying out.

The grade certificate is accepted by the Corn Trade Associations at the various European ports as final as regards quality, but the weight out-turn must be guaranteed by the shipper. Under-weight, therefore, causes unnecessary trouble and expense.

Members must mark their bags clearly and distinctly with the stencil plate supplied by the Society.

The consignor must see that railway trucks are in a clean condition before loading maize, and should, as far as practicable, load one grade only in a truck. This facilitates handling at the port. Less handling means less damage to bags, and consequently less short-weight.

Care must be exercised in loading so that there is no possibility of any bags falling off. Trucks must not be loaded over their carrying capacity, which is marked on each truck.

The following grades only are accepted by the Society free on rails:—

1. F.W.1.—To be sound, plump, dry and well cleaned, with a maximum of together 1 per cent. of discoloured or defective grain.

2. F.W.2.—To be sound, dry and well cleaned, and not contain more than 3 per cent. of defective and 5 per cent. of discoloured grain."

THE FROZEN MEAT TRADE.—We have received from Messrs. W. Weddel & Co. of London a copy of their "Review of the Frozen Meat Trade for 1914," which contains a fund of interesting information. During 1914 we see that 694,465 tons of frozen and chilled beef, valued at £29,960,642, were imported into the United Kingdom, as against 720,661 tons, valued at £26,662,896, for 1913. One of the least gratifying features in the whole position is the extent to which the United Kingdom is dependent on American interests for its supplies of imported beef. Out of 200,875 tons of frozen beef imported, only 101,440 tons were produced within the British Empire; and of the 95,638 tons brought from South America, fully half came from works operated by three North American companies. In the case of chilled beef, the position is still worse, because out of 241,090 tons imported into the United Kingdom, no fewer than 160,160 tons, or 66 per cent., came from these same works.

Important as supplies of foreign meat may be to the British public, it is to be noted that 60 per cent. of the beef, mutton and lamb consumed in the United Kingdom is still produced in the British Isles.

The following were the imports of all kinds of *frozen meat* into the United Kingdom during 1914:—

	Tons.	Value.
Australia	143,853	£6,048,030
New Zealand	142,700	6,379,587
South America	162,969	7,078,624
Other Countries	3,853	214,030 (est.)
Total	453,375	£19,720,271

South American *chilled beef* imports are not included in the above figures. In 1914 these amounted to 240,507 tons, valued at £10,205,022.

Approximately the average top prices for frozen beef during the year were:—Hindquarters: Australian, 5¼d. per lb.; New Zealand and Argentine, 5⅜d. per lb. Forequarters: Australian, New Zealand and Argentine, 4½d. per lb. These prices have never been approached as yearly averages since the trade assumed any importance, for which the war is responsible. The outbreak of hostilities saw a rapid advance in prices for both chilled and frozen beef. The value of chilled beef rose from 39s. 8d. per cwt. in the seven months ended July, 1914, to 52s. 1d. in the five months ended December, 1914; while in the same two periods the price of frozen beef rose from 35s. 8d. to 51s. 9d. per cwt.

Referring to some effects of the war upon European supplies, Messrs. Weddel & Co. summarise their findings as follows:—"At many points, therefore, the outbreak of war has already brought into prominence the vital importance, to most continental countries, of being able to draw upon extra-European sources for those additional supplies which make all the difference between scarcity and a reasonable sufficiency for present day requirements. For the moment, the development of the frozen meat trade on ordinary lines may remain in abeyance; but the future is manifestly going to be a time of such expansion in the consuming markets that the producing countries may find difficulty in coping with it."

Dealing with new sources of supply, reference is made to an experimental shipment of Brazilian beef received at Liverpool at the end of November. In regard to this shipment, it is stated that the meat arrived in excellent chilled condition, and the quality, although not up to the standard of the best River Plate beef, was satisfactory. The number of the cattle in the country is officially stated to be from 22,000,000 to 30,000,000.

In regard to the beef sent from South Africa, Messrs. Weddel & Co. state:—"Three small shipments of frozen beef were received last year from Durban. These trial lots contained some useful beef, but the quality was irregular, and called for more careful grading. In view of the great interest taken in the possibilities of the British market shewn by South African farmers (of whom a large party visited this country last year) there is good ground for anticipating a welcome development of the trade from this important Imperial source."

The prospects of the trade are thus referred to:—"Although the general outlook is necessarily obscured by the present abnormal circumstances under which trade is carried on, there can be no doubt that most of the conditions which a year ago made for world-wide shortage of meat supplies still remain in force. Possibly the Home supply may be capable of some slight temporary expansion; Australia and New Zealand can also be relied upon to maintain their output; while the various South American countries appear to be in a position to increase their aggregate production to some appreciable extent. The prospects of supplies from fresh sources, although brighter than they were a year ago, are still somewhat nebulous, if only because in most cases the quality of the animals now available is such that considerable improvement in breeding is necessary before exportation could be arranged on any large scale. Of course, if famine prices were ever to come into operation, the question of quality might be relegated to a secondary position; but for ordinary trade purposes, it will be impossible to rely on any of these prospective new sources of supply for some time to come. On the other side of the account, there can be little doubt that the various European nations, and also the United States, are becoming increasingly dependent upon external sources of supply, even under normal conditions; and the longer the war continues the more serious must their position become. In view, however, of the great uncertainty as to the duration of the war, and the inevitable magnitude of its economic effects, it is impossible at present to put forward even an approximate forecast as to the probable course of the world's market. So long, however, as the British Navy retains control of the sea, and the supply of insulated tonnage is maintained, it is scarcely likely that prices in this country will advance to any further material extent."

Read in conjunction with the foregoing extract, Mr. Bevan's article, "Water in the Diet of Live Stock," appearing in this issue, is of peculiar interest. Messrs. Weddel & Co., in dealing with the prospects of supplies from fresh sources, tell us they are somewhat nebulous, for *considerable improvement in breeding is necessary before exportation can be arranged on any large scale.* Mr. Bevan's whole article, which goes further than the title would suggest, centres around this point, and we venture to think that the advice he tenders will have a marked effect on the object we all have in view, viz., the improvement of our stock.

MAIZE MEAL BREAD.—An interesting controversy has been taking place in the Johannesburg Press and the "Farmers' Weekly" regarding the practicability of making bread from maize meal used in conjunction with flour. The discussion appears to have arisen from an interview a representative of the "Rand Daily Mail" had with Mr. J. W. Quinn, the well-known baker of Johannesburg, who expressed the definite opinion that it was impossible to make a saleable loaf with maize meal used in a higher proportion than 15 per cent. Mr. Quinn is reported to have said that he had carried out exhaustive experiments, and had enquired into the matter when in America, but had found the project infeasible. This produced a sheaf of letters to the Press, various correspondents claiming to be able to make a satisfactory loaf with a much higher percentage of maize meal than the quantity in question. In consequence of the interest taken in the matter, the "Transvaal Leader" organised a maize bread competition, when it is stated various samples of excellent loaves, in which at least 50 per cent. of maize meal had been used, were exhibited.

The matter is really of world-wide importance, for the price of flour has risen very considerably since the outbreak of war, and from what can be seen, it is likely to remain at a high level for some time. Apart from this, the extent to which South Africa is concerned will be realised when it is noted that during 1914 the imports of wheat and flour into the Union amounted to £1,374,519. If, as appears to be the case, a commercial loaf can be made with maize meal used in the proportion claimed, there is no reason why it should not be substituted for flour, for it is highly nutritious and quite palatable. We sincerely hope that something tangible will result from the tests which have been made, and that in the near future we shall see the staple product of the country occupying a more important place in the daily dietary.

We are publishing in this issue some maize food recipes taken from Farmers' Bulletin No. 1, issued by the Transvaal Department of Agriculture, and with these give the winning recipe at the competition in question, as well as one commended by the judges for its clearness. In the former recipe the proportion of maize meal used was 71 per cent.

OUR IMPORTS.—The Trade Returns for 1914 shew a somewhat better position in regard to the importation of foodstuffs which could be produced in the country. At the same time, adding to food supplies such articles as candles, soap and tobacco, we find that we are still sending something over a quarter of a million pounds sterling out of the country for the ordinary necessities of life. Of course in regard to tobacco, it must be remembered that a proportion of the imported article is made from our own leaf, and that we are only paying for the cost of manufacture.

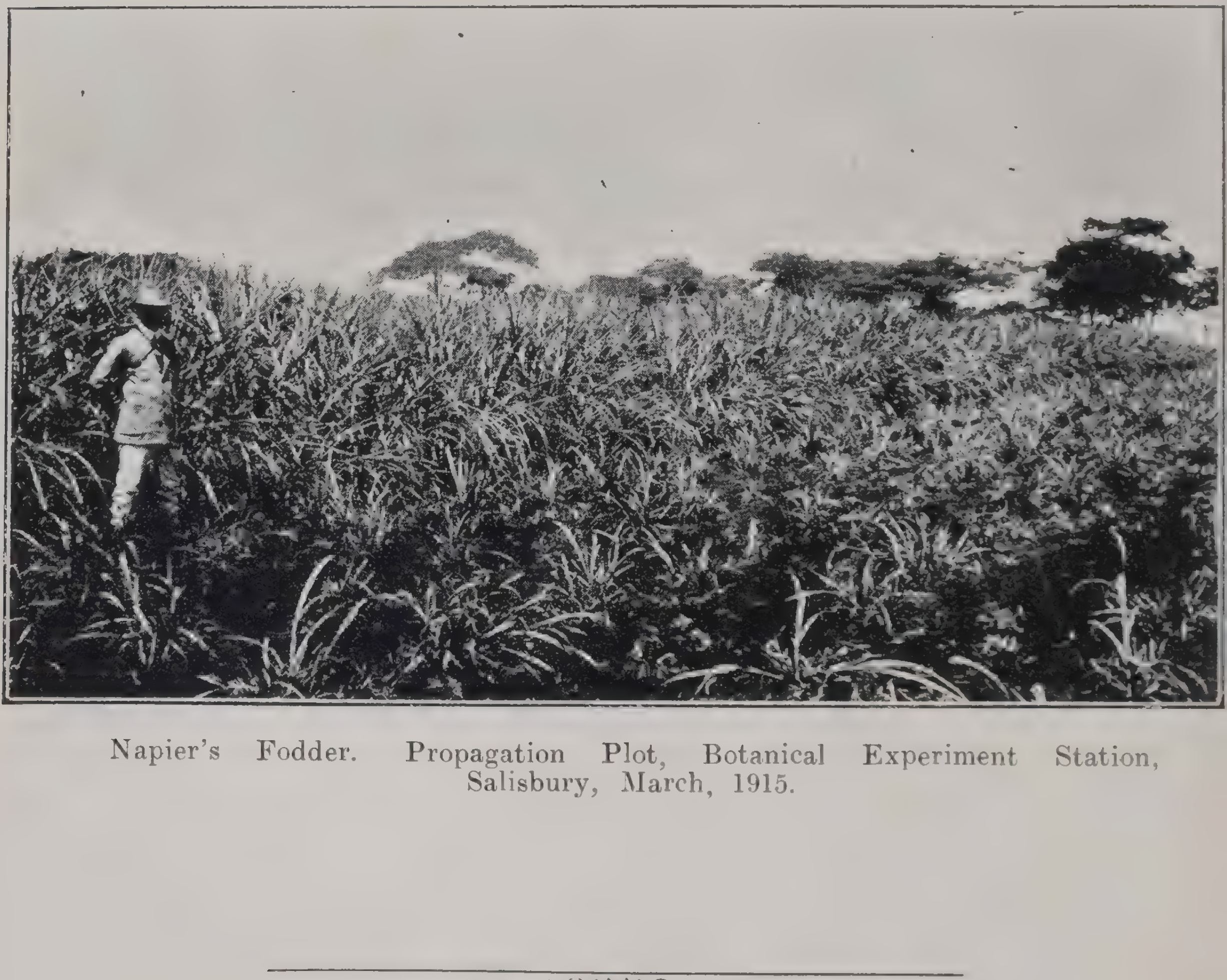
It might be contended that the decrease in the importation of the foodstuffs in question was due to the war, but an examination of the returns shews that, up to the end of the year, we were but little affected.

The most conspicuous item is butter, of which we imported 180,052 lbs., value £13,088—173,388 lbs. from the Union and 16,654 lbs. from overseas—against 392,519 lbs. in 1913. The establishment of the Gwelo Creamery is, of course, responsible for the greatly reduced quantity of butter imported, and we have no doubt that the present year will see a still further reduction. Considerable difficulty, we understand, was experienced by the Creamery in procuring cream during the winter months, but the last dry season was a very trying one for the dairy farmer, and we do not anticipate the same trouble this year. Further, farmers are to a much greater extent making provision for the winter feeding of their stock, and this will appreciably improve the position in this respect.

Our imports of eggs amounted to £8,652, against £9,874 during 1913. We expected to see this item reduced to a greater extent during 1914, but look for better things this year, for poultry keeping is rapidly gaining in popularity. The difficulty at present (as it is with many other of our commodities) is that there is always a scarcity of eggs at a certain period of the year. Our poultry must produce a regular supply of eggs, and this can be done by early hatching and proper housing of pullets during the wet months. Our imports of wheaten meal and flour remained much about the same, the figures reading:—S.A.P., £31,556; not S.A.P., £25,033; against £30,972 S.A.P. and £27,997 not S.A.P. for 1913. The success which has been attained at the Government Experimental Station with rust-resisting varieties of wheat leads us to hope that before very long we shall be able to grow summer wheats in this country, and thus effect a big saving in our flour bill. One of our biggest items of expenditure is in preserved meats. Under the heading *Meats, fresh, frozen, preserved (including bacon and hams)* we paid out in 1914 £46,605. During 1913 these items cost us £56,074. The operations of the Bacon Factory will no doubt affect these figures somewhat, but there would appear to be ample scope for the opening up in this country of a canning industry, of which we hear whispers. Candles and soap during 1914 cost us £47,800, the former £23,250 and the latter £24,550. These are big items, and it is rather extraordinary that no effort has as yet been made to manufacture these articles in the country.

Referring to our exports, we find we exported maize during the past year to the value of £111,984, which constitutes a record for the Territory. Hides and skins form an important item of our export trade, the figures reading:—Hides and skins, ox and cow, £19,917; goat and sheep, £7,333. This is a slight reduction on the total for the previous year. Of tobacco, we exported during 1914 2,287,406 lbs., which was valued at £113,659.

Rapoko and Kaffir Corn for Export.—We observe there is a good and an increasing demand on the Home market for rapoko and kaffir corn, and that prices comparing favour-



Napier's Fodder. Propagation Plot, Botanical Experiment Station, Salisbury, March, 1915.

ably with recent maize quotations are being paid for these grains. The local market for either rapoko or kaffir corn is very limited, and there would appear to be a good opportunity of establishing an export trade with these crops, which are easily and safely grown in this country. We notice that at the Maize Conference held at Capetown last year a resolution was passed requesting that the Union Trades Commissioner should enquire into the demand existing at Home for these crops, but we are not aware at the present time what the result of this enquiry is. The local Farmers' Co-operative Society is, we believe, looking into the matter, and if the prospects are sufficiently favourable, will no doubt take action towards opening up a market for the grains in question.

Napier's Fodder.—As a result of the notice which appeared in the last issue of the *Journal*, offering rooted slips of Napier's fodder to farmers at reduced prices, we are pleased to say that a great number of applications was received, and that it was found possible to supply each applicant. It is obvious that the farmer is now convinced of the utility of this excellent fodder plant. The ease with which it can be propagated is shewn by the following letter, which has been received from Mr. H. K. Bracewell, Ruia, Salisbury:—"It may be of interest to you to know that on 29th October, 1913, the Department gave me three slips (rooted) of Napier's fodder. These I put in the ground on 1st November. To shew how well the fodder has done, I give you some particulars:—

17th January, 1914—3 roots divided and made 188.
12th April, 1914—180 roots divided and made 1,050.
10th December, 1914—Planted 5,000 slips.
5th January, 1915—Sold 1,000 slips.
8th February, 1915—Planted 1,250 slips.
27th February, 1915—Sold 1,400 slips.

This is all grown on red sandy loam, and a large quantity will be ready to mix with mealies for my ensilage. Two roots which my wife placed in the garden on 17th April, 1914, she divided and planted out on 7th December, making 224."

MAIZE CONTRIBUTION TO IMPERIAL GOVERNMENT.—The total number of bags of maize contributed by the farmers of this Territory as a free gift to the Imperial Government amounts to 5,685. This figure, considering the number of farmers in the country, is a very respectable one, and we feel sure that the patriotic feeling which has been given expression to in such a practical manner will be much appreciated by the Imperial authorities. It is not decided yet how the maize will be disposed of, but it is probable that it will be utilised in one of the African theatres of war.

RHODESIAN CATTLE AND THE WITWATERSRAND AGRICULTURAL SHOW.—The Union Government has agreed, subject to certain conditions, to the movement of *pedigree* cattle from Southern Rhodesia, to compete at the Witwatersrand Agricultural Show, which is being held at Johannesburg from the 5th to the 10th April. Applications for permits for the movement of cattle must be made to the Principal Veterinary Surgeon, Pretoria, and such applications must be accompanied by a recommendation from the Chief Veterinary Surgeon, Salisbury, that he considers the movement to be safe. Some of the conditions imposed are that the cattle must be free from ticks and are to be forwarded in sealed trucks. After the show, the animals have to return at once to Rhodesia, or, if sold, be quarantined for 30 days. At the time of going to press no application for the removal of stock had been received by the Chief Veterinary Surgeon, Salisbury, but cattle owners in this Territory will, we are sure, note with appreciation the relaxation of the regulations in this instance.

DOG PERMITS.—Subject to the consent of the Veterinary Department, Pretoria, dogs may now be removed from Southern Rhodesia to the Union of South Africa. Applications must be accompanied by a certificate from the Chief Veterinary Surgeon, Salisbury, that the dog is free from disease, and animals are liable to be quarantined for two months at destination.

Specimens for Examination.—Attention is drawn to the fact that specimens are frequently received for examination by the Agricultural Chemist and Veterinary Bacteriologist without any particulars as to their character or source. To avoid mistakes, it must be clearly understood that, in future, the examination of materials so submitted will not be undertaken. Samples must in all cases be carefully labelled for purpose of identification.

Sale of Farm and Market Garden Produce.—The Beira and Mashonaland and Rhodesia Railways have issued the following circular:—" With the object of fostering commercial intercourse, and bringing suppliers and consumers into direct touch with each other, it is the intention to exhibit posters at the stations on these railways setting forth the names and addresses of farmers, market gardeners and others who are prepared to supply small consignments of produce, such as butter, cheese, milk, cream, meat, poultry, game, eggs, bacon, ham, fresh vegetables and fruit. Those desirous of having their names included in the list should communicate with the nearest station master, or district traffic superintendent, giving the following information:—(a) Name and full postal address of supplier; (b) class of produce for sale; (c) quantity; (d) price per lb., per head, or per bag, as the case may be; (e) whether the produce can be supplied weekly, fortnightly or monthly. And any other information that may be of use to the purchaser or consumer."

The scheme, which has been adopted with considerable success in the Union, is an excellent one, and we trust farmers and producers will take advantage of this opportunity of selling their produce direct to the consumer.

Tropical Agriculture.—The proceedings of the Third International Congress of Tropical Agriculture, which have just been published (London: John Bale. Sons and Danielsson; 10s. net), form a substantial volume of over 400 pages. The volume is edited by the honorary secretaries of the Congress, which, it will be remembered, was held last June at the Imperial Institute. This was the first time the Congress had been held in London, and the result was most successful. More than 150 papers, coming from authorities in 50 different countries, were presented to the Congress, and important discussions took place on several of the principal problems connected with tropical agriculture. Abstracts of the papers and full reports of the discussions are printed in the proceedings, together with the address delivered by the President of the Congress, Professor Wyndham R. Dunstan, C.M.G., LL.D., F.R.S., Director of the Imperial Institute, and President of the International Association for Tropical Agriculture.

Amongst the subjects dealt with in the proceedings are Technical Education in Tropical Agriculture; Organisation of Agricultural Departments in Relation to Research; Agricultural Credit Banks and Co-operative Societies; Sanitation and Hygiene on Tropical Estates; Legislation against Plant Diseases and Pests; Fertility of Soils in the Tropics; Variation in Plantation Rubber; Cotton and Cotton Cultivation; Jute and Hemp Fibres; Cereals; Sugar; Cocoa; Tobacco; Oils and Oil Seeds.

The speakers taking part in the discussions included the Right Hon. Lewis Harcourt, M.P. (Secretary of State for the Colonies), Earl Kitchener, the Earl of Derby, Lord Emmott, Sir George Reid, Sir Hugh Clifford, Sir Horace Plunkett, Sir Ronald Ross, Sir H. Hesketh Bell, Sir Sydney Olivier, Sir E. Rosling, and a host of authorities on tropical agriculture from all over the world.

This book thus forms a valuable record of expert opinion on all the more important problems of Tropical Agriculture and Colonial Development, which at the present time are of particular interest.

Crop Rotation in Southern Rhodesia.

By J. A. T. Walters, B.A., Assistant Agriculturist and Botanist.

The necessity for some system of crop rotation in a country like Rhodesia is becoming more and more evident as time goes by, and the farmer realises that the yields from his maize lands decrease steadily when this crop is grown continuously on the same ground. In older countries science and practice have hit upon suitable rotations which maintain both the tilth and the fertility of the land, and at the same time provide the farmer with marketable crops which give an adequate money return. The difficulty in Rhodesia is undoubtedly that of finding an outlet for the crop that can be grown, although in this connection it is a commonplace that crops put into stock almost invariably give better returns than those placed directly on the market. And if, indeed, we assume that the farmer is prepared to put some of his crops into his stock, the difficulty of finding a suitable rotation is largely removed. When, however, the farmer insists on placing the whole of his crop directly on the market—as has largely been the practice up to now—it is almost impossible to devise a rotation consisting entirely of money crops which can be grown continuously and yet maintain the good tilth and fertility of the soil indefinitely.

Maize is undoubtedly the staple crop of the country, and the one to which the bulk of the farmer's energies are directed. It is thus fairly evident that any recommended system of rotation must be one which will enable the farmer to grow maize as his principal crop in the most advantageous way for the longest period of time. To do this successfully three features of good farming must be kept in mind by the farmer:—

(1) the maintenance of sufficient available plant food in the soil to carry the crop year after year;

(2) the maintenance of a sufficiency of humus or organic matter in the soil to keep it continuously in good tilth or mechanical condition;

(3) the suppression of pests, such as weeds, insects and fungoid diseases, which will reduce his crops, or make it impossible to grow them.

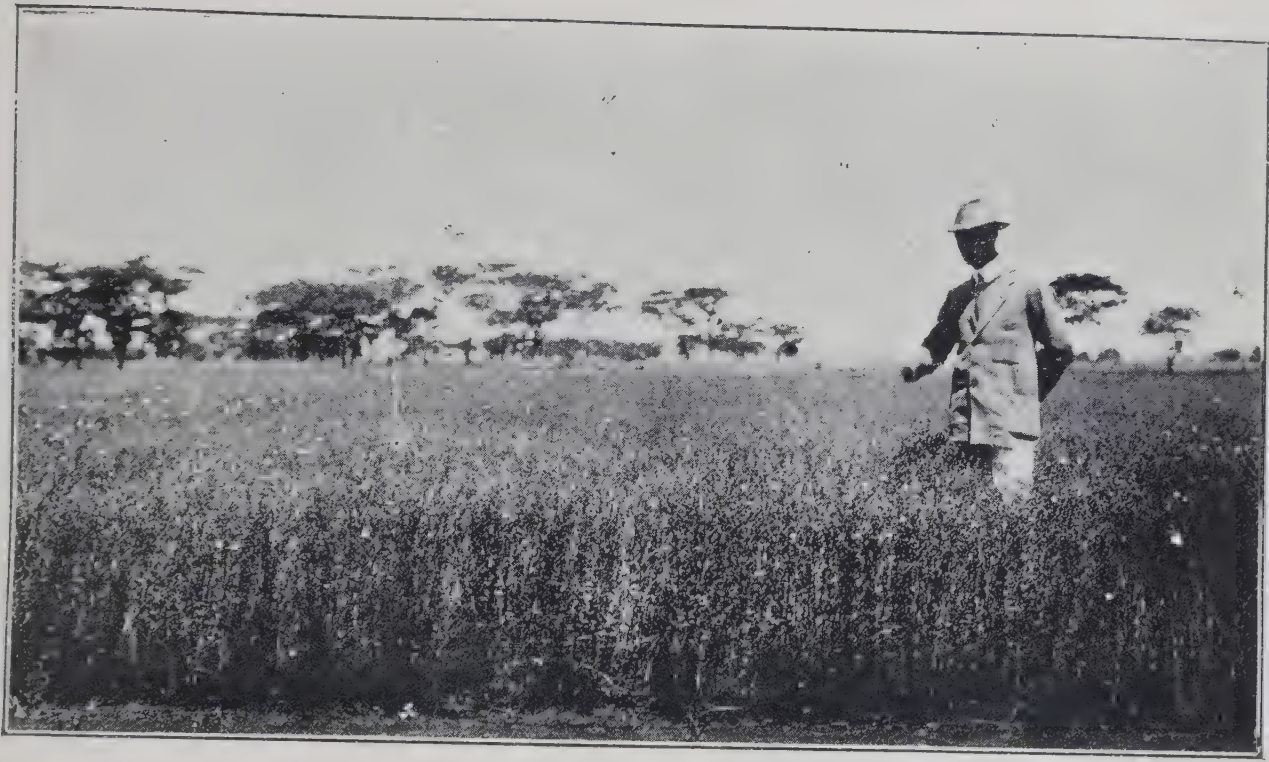
The first feature can be secured largely by the use of artificial fertilisers—a necessary expense which the farmer has to undertake if the bulk of his crop is to be maize. The other two are secured by the practice of judicious rotations, without any further expense than the sacrifice involved in putting down a portion of the land under another crop than maize. These other crops, having different habits of growth, will draw upon food supplies from different depths and different sources, and in some cases will leave behind them a stubble which provides considerable amounts of organic matter. It is only right, however, in urging upon the farmer the necessity for rotation crops, to indicate as far as possible only such crops as will give him a fair return comparable at least with that obtained from maize. But even this does not affect the main contention that, whether payable or not, some other crop than maize has to be grown occasionally, in order to keep up the returns from the maize crop itself. Experiments in rotation carried out on the maize belt in Illinois, U.S.A., over a long period, gave the following striking results without the use of manure or fertiliser. The yields are the average for the last three years of the trial:—

Maize grown continuously for 31 years yielded 6½ bags per acre.

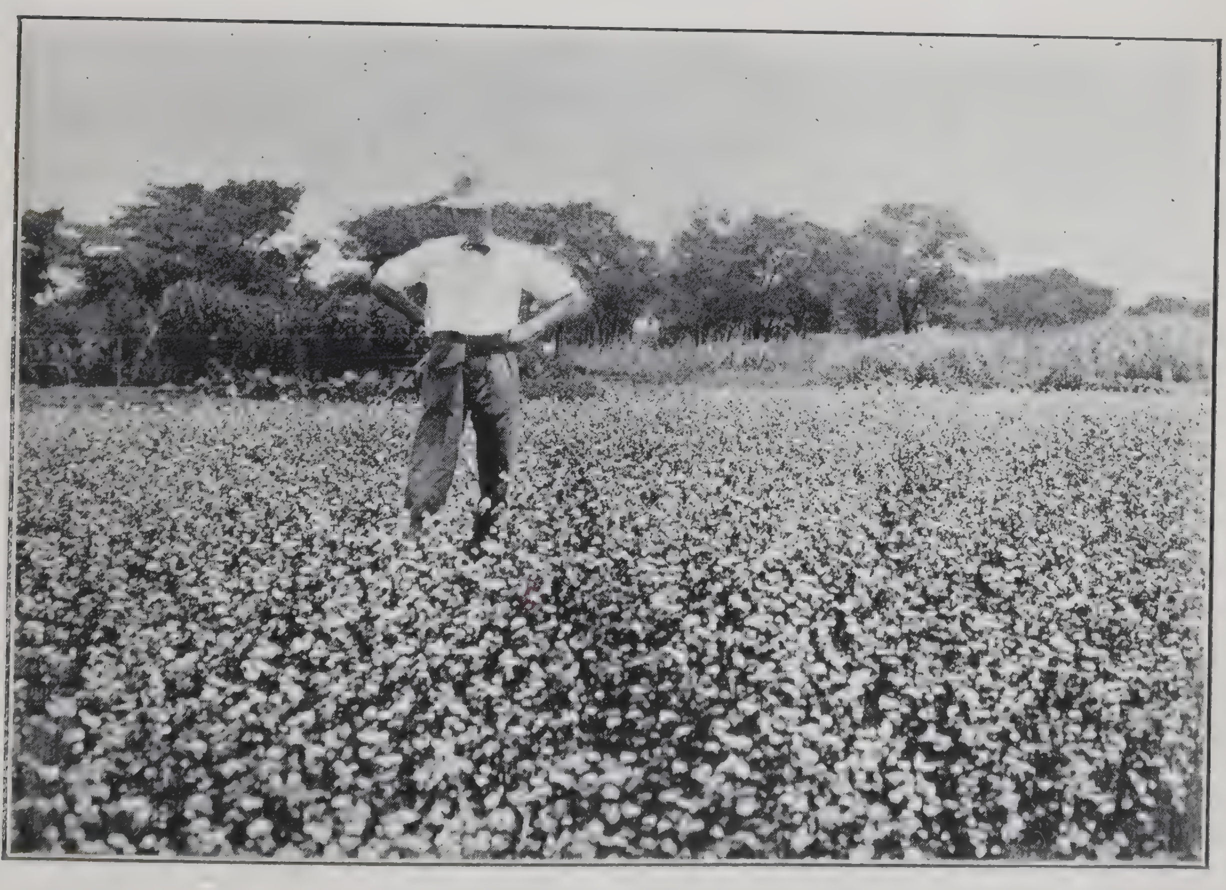
Maize grown continuously for 15 years yielded 10 bags per acre.

Maize and oats alternately for 15 years yielded 15½ bags per acre.

Maize, oats and clover in rotation for 15 years yielded 18 bags per acre.



Linseed varieties. Botanical Experiment Station, Salisbury, March, 1915.



Common Buckwheat. Botanical Experiment Station, Salisbury, March, 1915.

Before indicating any system of rotation for Rhodesia, it will be well to ascertain how other crops compare from the point of view of profit with maize. The estimates given below are based in the main upon the crop-producing capacity of the red soil of the country, although in some few cases better returns are obtained at lower cost on the sand veld. Taking the return for maize as eight bags per acre, which will probably be a fair average for Mashonaland, and the price at 8s. per bag, we have a gross return of 64s. per acre. The following table shews how other crops stand in relation to this:—

Crop.	Yield.	Price.	Gross Return per acre.
Grain—			
Wheat	2 to 3 bags	£1 5s. per bag	£2 10s. to £3 15s.
Buckwheat	6 to 7 bags	15s. per bag	£4 10s. to £5
Linseed	2 to 3 bags	2d. to 9d. per lb.	£3 to £10
Hay—			
Oat	1 to 2 tons	£4 to £5 per ton	£4 to £6
Manna	¾ to 1 ton	£3 per ton	£2 to £3
Teff	¾ to 1½ tons	£3 per ton	£2 to £4
Velvet bean	1 to 2 tons	£4 per ton	£4 to £8
Legumes—			
Pea nuts	1,000 lbs.	1d. per lb.	£4 to £5
Dhal	1,200 lbs.	2d. per lb.	£8 to £10
Roots—			
Mangels	6 to 10 tons	£2 per ton	£12 to £20
Pumpkins	3 to 5 tons	£3 per ton	£9 to £15
Majorda melons	5 to 6 tons	£1 10s. per ton	£7 to £9
Potatoes, sweet potatoes, Jerusalem artichokes.			
Miscellaneous—			
Sunflowers	600 to 1,000 lbs.	¾d. per lb.	£1 15s. to £3
Kaffir corn	5 to 8 bags	10s. per bag	£2 10s. to £4

Notes on the above Crops.—Buckwheat is considered to be one of the best feeds for pigs in conjunction with maize, and may be sown later than most other crops.

Linseed is being bought by the oil factory at 2d. per lb. Seed exchanged hands last season at prices ranging up to 1s. per lb.

Velvet bean hay is a valuable addition to the ration for dairy and other cattle. Velvet bean pods are ground whole to make velvet bean meal. If cut for hay in March, considerable after-growth will be obtained for ploughing under in May or June.

Pea nuts generally fetch a higher price than that given above in the vicinity of mines. The dried tops make excellent fodder. This crop might also be grown as a green manuring crop to be ploughed under entirely in May or June.

Dhal is a perennial, and should occupy the ground for two or three years, and is useful in giving land a rest.

The root crops require kraal manure, and are usually more expensive to grow than most others. The results when well grown, however, repay the trouble. These are the only crops to which an application of kraal manure is recommended.

Kaffir corn is now fetching better prices in the European market than maize.

All the above crops can be utilised directly on the farm for the feeding of animals, whilst many of them are direct money crops. In the ordinary way farmers who are stockowners will grow at least one hay crop, one bean crop and one root crop. In this case a suitable rotation is easily indicated in which maize shall predominate.

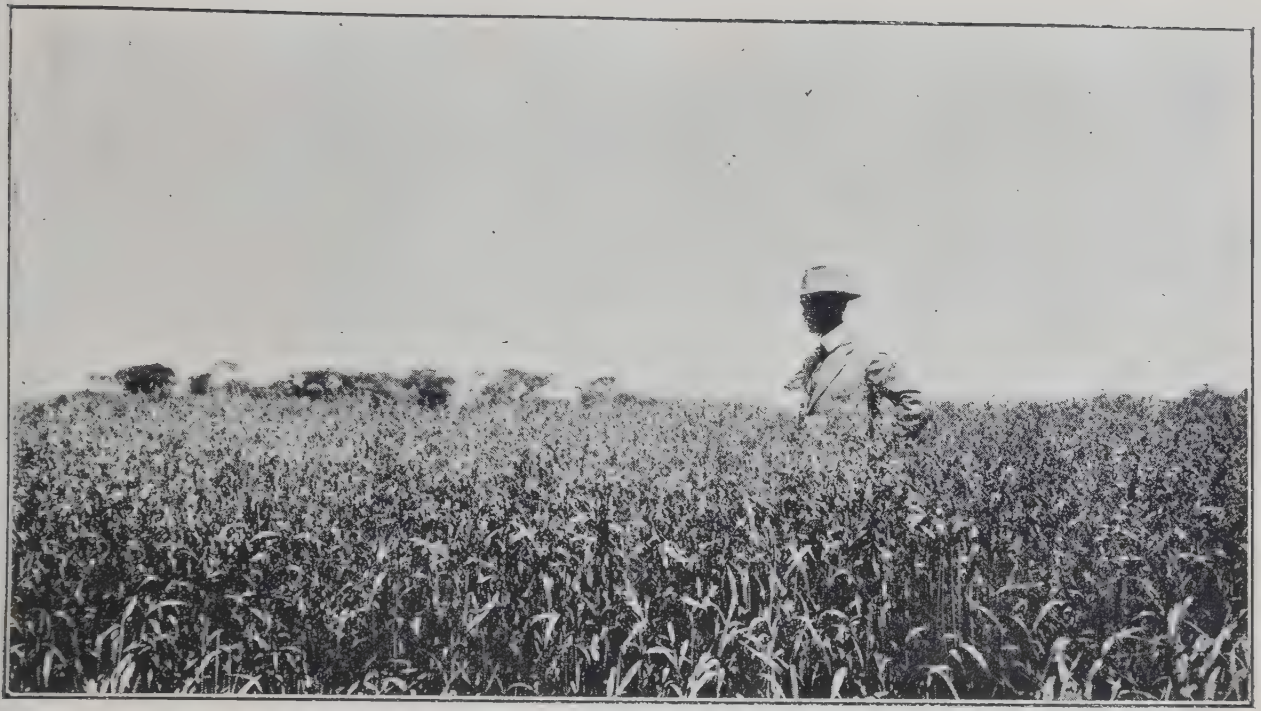
ROTATION NO. 1.

1st year, maize, fertilised.
2nd year, maize, unmanured.
3rd year, rotation crop.

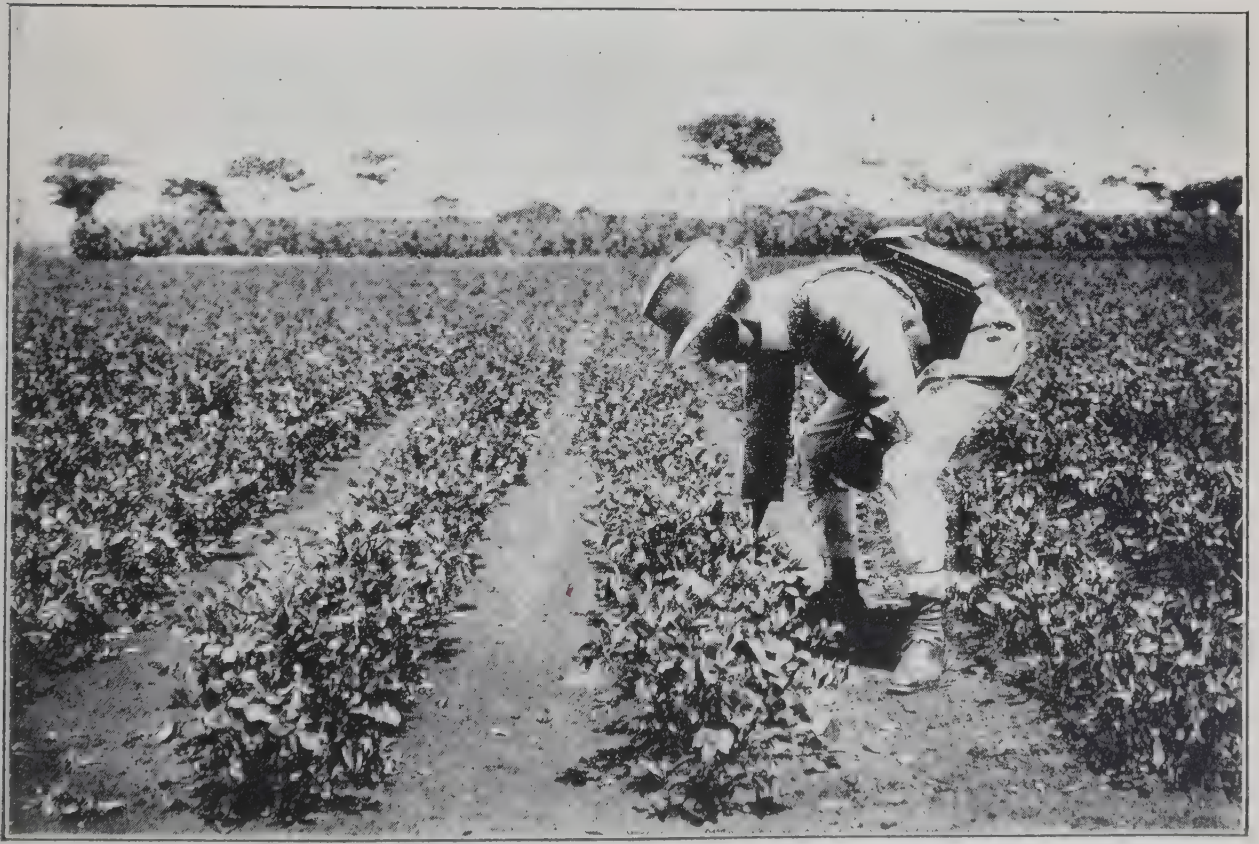
Under this system, two-thirds of the land will be continuously under maize, the other third being under other crops. The rotation plot might be composed of three different crops. Thus, out of (say) 300 acres we have every year:—

100 acres maize, manured.
100 acres maize, unmanured.
100 {
40 acres teff or manna.
30 acres velvet beans or pea nuts.
20 acres linseed, wheat or buckwheat.
10 acres root crops, manured.

The disposition of the lands for three years would be shewn as follows:—



Kherson's 60-day Oats. Botanical Experiment Station, Salisbury, March, 1915.



Spanish Ground Nuts. Botanical Experiment Station, Salisbury, March. 1915.

1915.	1916.	1917.
Maize, manured	Maize	Rotation crops
Maize	Rotation crops	Maize, manured
Rotation crops	Maize, manured	Maize

Thus every piece of land is fertilised once in three years, and also carries one crop other than maize. Any kraal manure on the farm is utilised for the raising of root crops, leaving a considerable quantity of humus in the ground for the succeeding crop, and the stubbles of such crops as oats, teff, velvet beans, etc., are ploughed in to provide a certain quantity of organic matter.

ROTATION NO. 2.

1st year, maize, manured.
2nd year, maize.
3rd year, rotation crop.
4th year, maize.

Under this system, three-fourths of the land is continuously under maize, of which one-third is fertilised each year. The weakness of this system is that the heavy cropping to maize denudes the soil of its humus excessively. There is no doubt but that three years' cropping to maize, with only one year's interval, taxes the land too heavily, and is bound to result in bad mechanical condition of the soil. A more ideal system of rotation than either of the above, would be to crop the land to maize three years in five, fertilising once or twice during that period, the other two years to be devoted to one stubble crop and one leguminous crop, the latter to be ploughed in if possible. Thus, this rotation would be:—

ROTATION NO. 3.

1st year, maize, manured.
2nd year, maize.
3rd year, hay crop (oats, teff, linseed, etc.).
4th year, maize, manured or unmanured.
5th year, legume (velvet bean, cow pea, or pea nut), ploughed in preferably, or root crop.

Under this system 40 acres out of 100 would be under crops other than maize every year. As a financial proposition it compares favourably with maize only. Thus, 100 acres maize, eight bags at 8s., gives a return of £320 gross. With a rotation of the kind indicated above, the yield would undoubtedly be increased by two or three bags per acre, and we have—

60 acres, 10 bags at 8s.	£240
20 acres teff grass at £3	60
20 acres other crops at £2 (say)	40
Total	£340

To this must be added the fact that teff grass and other crops are more easily handled than maize, and that an estimate of £2 gross per acre for the remaining 20 acres is low.

The above rotation, which, in the light of our present experience, and in view of the economic position of the farmer, is the one we recommend for Southern Rhodesia, may be interpreted as follows:—

Maize fertilised in the way indicated by the Agricultural Chemist (see *Rhodesia Agricultural Journal* for August, 1914, reprints of which may be obtained free of charge on application to the Department of Agriculture) gives excellent returns in the first year of application, and the residue shews a marked increased return in the second year over unmanured ground. In the third year, a change of crop is necessary, both to improve the mechanical condition of the ground and to enrich it in organic matter, which is largely depleted by a crop like maize, and which also tends to disappear rapidly during the long dry winter season. In the the fourth year maize may again be resumed, preferably with a dressing of fertiliser, which may be lighter than that given in the first year. In the fifth year a crop should be grown with the object of providing the land with a maximum of humus, and preferably a nodule-bearing leguminous crop, which will supply the soil cheaply with nitrogen, the whole or part of the crop being ploughed in. If velvet beans are cut for hay or ensilage early in the year, a considerable aftergrowth will be made, which will be available for ploughing under. Even when grown with maize for ensilage, they are of considerable value for this purpose. The amount of nitrogen supplied by an acre of velvet beans (tops and roots) has been estimated by American investigators at from 130 to 200 lbs. per acre. Pea nuts can also be profitably grown as a green-manuring crop, to be ploughed in entirely in May or June. For this purpose they may be sown as late as the end of January. Cow peas grow on poor soil, and are one of the best crops for green-manuring purposes. Unfortunately the stem maggot makes the crop uncertain in this country, although occasionally excellent crops are seen. It cannot be too strongly impressed upon the farmer that humus must be restored to the soil by some means or other, if profitable agricultural operations are to be continued.

The rotations suggested above are by no means perfect. They denote an attempt to reconcile the growing of maize as a bulk crop continuously, with the maintenance of food material and tilth in the soil. The ever-present danger is the depletion of the humus in the soil, and this the farmer must be prepared to guard against, even at the expense of having to plough under the whole of a crop once in five years. Although the suggestions given above are based mainly on the experience gained in red soils, they will serve as a basis for suggestions for the treatment of sand soil, the main difference being that in the case of sand soils the provision of humus is still more imperative.

Home Butter-Making.

By R. C. Simmons, Chief of Animal Industries Branch.

Enquiries are received from time to time by the Department of Agriculture regarding butter-making, and although the majority of farmers are familiar with the process, and numerous books and pamphlets dealing with the subject are available, it is thought that an article on "Home Butter-Making" may be of service to some readers of the *Journal.* The writer has therefore compiled the following notes, which, on the whole, are the same as may be found in numerous books and works on dairying, but which have been modified here and there in accordance with the teachings of a fairly long experience of butter-making in South Africa under ordinary farm conditions.

The Separation and Care of Cream before Churning.—The making of good butter begins with the milking of the cow and the subsequent handling of the product. On these points one cannot do better than refer the reader to an article entitled "Cream; its separation, handling and sale to butter factories," which appeared in the June, 1914, issue of this *Journal*, and subsequently was printed as bulletin No. 184, which is obtainable from the Department of Agriculture.

When intended for butter-making at home it is obviously not necessary to send the cream away; therefore, the instructions in the article referred to may be followed, except that a cream cooler may be dispensed with.

Before it is churned, cream should be what is termed "ripe," that is to say, it should acquire a degree of acidity or sourness. Perfectly fresh cream takes longer to churn, and produces butter with an insipid flavour. The warmer cream is kept the quicker it will ripen, and the cooler it is the longer it may be kept before churning. On most farms therefore, where it is not desired to churn more than perhaps twice a week in winter and three times in summer, it is essential that the cream should be kept cool. In very cold weather it is best kept at a temperature of about 55 degrees or 60 degrees Fahr. To ripen cream properly, it should be exposed to clean fresh air as much as possible; therefore, a wide open vessel and frequent stirring is advised. It is desirable that the cream for any one churning should be evenly ripened throughout. To ensure this, one should not add fresh cream to the bulk less than twelve hours before churning. In order to obtain a good flavoured butter, the cream must not be over ripe—it should have a clean sharp acid taste, and be free from any musty or rancid flavour. In practice, it is found that cream produced under ordinary clean conditions becomes first merely sour, and, later on, if kept too long, it will develop undesirable flavours. The ripening or souring must, therefore, be carefully watched. The best method of testing the acidity of cream is by tasting it; after a little experience no difficulty will be found in gauging the correct degree of ripeness very closely.

UTENSILS REQUIRED.—Although butter can and is frequently made in all sorts of vessels, and under all sorts of conditions, it is not worth while attempting to make it on a commercial scale without certain essential utensils. The following list, with the approximate prices at which they may be obtained locally, includes those only which the writer considers really necessary if good butter, capable of keeping two or three weeks in summer, is to be made:—

Utensil.	Price.
A sufficient number of good buckets, according to the number of cows in milk and the amount of butter to be made up at one time.	Light steel 3 gall. pails, 8/6. Tin billies for milking, 2/-. Enamelled buckets, 5/-.
A strainer of a type having cotton wool discs in addition to the wire gauze discs.	7/6 to 12/6, including 1,000 cotton wool discs.
A reliable separator ... ... (NOTE.—The old-fashioned plan of setting milk in pans cannot now be contemplated except in cases of emergency.)	£8 to £11 and upwards.

Utensil.	Price.
An earthenware, enamel or steel vessel for storing cream.	To take $3\frac{1}{2}$ galls., 15/-. For smaller quantities an enamel bucket does very well.
A churn (end-over-end) to churn 9 lbs. of butter at a time.	£3 10/-.
Larger sizes, up to	£12 10/-.
Metal churns	£1 15/- to £3.
A butter scoop	2/-.
Two pairs of Scotch hands, per pair ...	3/6.
A reasonable supply of butter muslin, straining cloth, butter paper and boxes for packing.	Say £2.
Scales and weights	£1 15/-.

A butter worker is not absolutely essential, but it does much better work than can be done by hand, and in much less time, so that it is almost always an economical investment. A small one may be purchased for about £2, but the somewhat larger and more convenient types range from £3 10s. upwards, according to size.

In addition to the above list, a standard thermometer for the dairy and a floating thermometer for use with cream and milk, a hair sieve and some brushes for cleaning the churn and butter worker, will all be found convenient, and will cost, say, £1 in all.

THE CHURN.—Whatever kind of churn is used, it should be of such construction that there are no corners or crevices in which butter milk, etc., may lodge and escape detection when the churn is cleaned, or projections which may be in the way when the butter is taken out of the churn. Probably the best all-round churn is the "end-over-end," perfectly plain inside. At the same time, excellent butter may be made in glass churns if a small quantity only is required, or in a type of metal churn not uncommon in Rhodesia. The chief objections to the metal churn are that it is liable, if left to boys, to escape thorough cleaning, and in hot weather the cream will develop heat more quickly in it than in a wooden one. It has an advantage over the wooden churn in that it is not liable to dry out and fall to pieces when not in use. Wooden churns often require to be filled with water when not in constant daily use.

Preparation of the Churn.—A new wooden churn should be scalded with boiling water and washing soda till the water comes away colourless. For the ordinary daily preparation all churns, except glass ones, should be first filled with boiling water, the lid should be closed and the handle turned. Most churns have a ventilating arrangement in the lid, in which case, after the handle has been turned once, let off the steam and repeat the process until the excess steam is exhausted. The boiling water having been run off, it should be replaced by cold; the lid should be closed again and the handle turned several times. In winter the cold water may now be run off and the cream put in, but in summer, care must be taken that the churn is not too hot. A not uncommon plan is to scald the churn in the evening and then, after swilling round with cold water, to fill again with cold water to which some salt has been added, and to leave it thus till morning. In the morning the water is run off just before churning. If this plan is adopted, care must be taken that no part of the inside of the churn is dry when the cream is put in.

The Temperature at which to Churn Cream.—Besides ripening the cream, it should be brought to a proper temperature before churning. If too warm, it will churn too quickly, and there will be a loss of fat in the butter milk; if too cold, it will take a longer time than is necessary. In summer time, owing to the fact that very few farmers possess anything of the nature of a refrigerating machine, one must usually be content to get the cream as cool as is possible. It is sometimes cooled by placing the vessel in which it is contained in a canvas trough filled with water, in which the evaporation of the water reduces the temperature on the same principle as a water bag. Sometimes brick or stone and thatched rooms are available in which the cream may be kept reasonably cool. A plan which the writer has sometimes found useful in hot weather is to hang up the cream (secured by muslin or something of that kind from flies and dirt, but not closed down) in a tree. The cool night wind under the trees will often reduce the cream to quite a low temperature by 4 o'clock in the morning. Whatever the method adopted, care must be taken that the cream does not become tainted, and any canvas water trough, wet sacks or other arrangement of that kind must be kept scrupulously clean and sweet.

In some parts of Rhodesia it is quite possible that the cream may require warming in winter, in which case it should be done by standing the vessel containing the cream in another vessel of hot water, and stirring it continuously until the desired temperature is reached. Hot water should never be put into cream. From 55 degrees to 60 degrees Fahr. is about the best temperature at which to churn, the lower temperature being used when the air is hot and the higher when it is cool. The ideal would be to have the atmosphere of the dairy at 60 degrees Fahr. and the cream at 58 degrees Fahr. The above temperatures can, as a rule, only be used by the farmer as a guide; in practice he can do little more than get as near to them as may be by means of working in the very early morning in summer and in the middle of the day in winter. It should be remembered that all water to be used in the process of churning must in summer be cooled as well as the cream. It does not matter how cold the water is in the winter.

Churning.—When all is ready for churning, the cream should be strained through a coarse muslin. If it is very thick, it may be thinned down with a little clean cold water. It should then be brought to the right temperature (in winter, for instance, it may require warming) and poured into the churn. It is most important to strain the cream at this juncture, not only in order to arrest any dirt or flies that may have gained access to it, but to extract any pieces of curd which may have formed at the bottom of the cream vessel, and which are most difficult to wash out of the butter when once they get into the churn.

Having poured the cream in, close the lid of the churn tightly and proceed to churn. For the sake of simplifying instruction, we will suppose that one is using the ordinary end-over-end churn; the general instructions, however, apply to all forms of churns.

It is difficult to teach the art of churning except by actual demonstration, but the following notes will perhaps help the beginner:—

1. The churn should never be more than half full.

2. Commence churning slowly (cream when churned gives off certain gases, which come away easily if churning is commenced slowly).

3. Ventilate the churn at first after every turn, and afterwards occasionally throughout the whole process.

4. After three or four minutes quicken the pace of the churn to a brisk movement. Avoid an even revolution of the handle, and work just as one is told not to work with a separator.

5. The warmer and the riper the cream, and the warmer the atmosphere, the slower the churn should be turned; and *vice versa*, the fresher the cream and the cooler it and the atmosphere are, the quicker one may churn.

6. It is better to so arrange matters that the butter comes in 20 minutes than to try to churn it in a shorter time. Careful daily observation will soon enable one to do this.

7. When the butter "breaks," that is, when minute pieces of butter appear on the glass in the lid, stop churning, remove the lid and swill it down with the coldest water obtainable; also pour about a pint or two pints of cold water into the churn. Replace the lid, give a few turns until the particles of butter are about twice the size of mustard seed, and the butter milk ceases to adhere to the glass. The churning is now finished.

8. Take off the lid, swill it down with a cup of cold water, so as to wash off any particles of butter adhering to it back into the churn, and put it down. It is not required any further.

9. Swill down the inside of the churn with cold water, so as to wash off any particles of butter sticking to it above the line of the butter milk; place a piece of wet clean muslin over a hair sieve; run the butter milk off the churn by removing the vent peg, after placing a bucket under it, and holding the sieve and muslin above the bucket. When the butter milk is nearly all run off, replace the vent peg and return any particles of butter that may be in the sieve to the churn.

10. Pour a bucket of clean water, as cold as it can be got, into the churn and sway the churn lightly backwards and forwards a few times. Run off the water in the same way as the butter milk.

11. Repeat the washing exactly as in Note 10, and if necessary do it a third time, until the water comes away clear.

12. Pour into the churn enough brine to float all the particles of butter. (Brine should be prepared before commencing to churn by adding 1 lb. of clean dairy salt to 1 gallon of water and straining it, after it is dissolved, through a fine muslin.) Let the butter remain in the brine for from 10 minutes to an hour; the longer it remains in, the more salt will be the flavour of the butter. In warm weather be careful to remove the butter before it begins to get soft.

13. While the butter is in the brine, prepare the butter worker. This should have been scalded and soaked like the churn beforehand, and all that remains to be done should be to give it a final swill over and run off the water.

14. Holding the hair sieve covered with muslin in the left hand close to the edge of the churn and over a bucket, remove the butter from the churn with the scoop. Place the butter first in the sieve and then, as that becomes full, tip it out on to the middle of the butter worker. With practice all the butter can easily be taken out with the scoop, and it is the right way to do it.

15. Collect the butter together with the Scotch hands, then run the roller of the butter worker over it, taking care to push the roller along as it is revolved, so as to exert a pressing and not a rubbing action on the butter. Collect the butter again with the Scotch hands and repeat the rolling, mopping up any surplus water on the butter or on the table each time with a clean muslin rag, until about two-thirds of the water has been pressed out.

16. The soaking in brine assists in the removal of the butter milk, and also salts the butter to a certain extent. If no further salting is done, the result may be termed fresh butter. If a more pronounced salt flavour is desired, or the butter is intended for keeping, the salting must be done at this stage.

17. Only the very best and purest dairy salt should be used, and it should be dry and finely powdered. When the butter is rolled out on the butter worker, sprinkle the salt over

it in a fine layer with a dredger, then roll the butter up and repeat the process until all the salt is rolled in, taking care not to continue rolling until the butter becomes greasy; special care is required to avoid this if the atmosphere is warm. About ¼ ounce of salt per lb. of butter will be sufficient for mild salting, and from ½ to ¾ ounce per lb. of butter for heavy salting or for potting or preserving butter.

18. When as much water has been extracted from the butter as may be done without making it greasy, the butter should be made into pats or bricks if required for use in the near future, or put into jars or enamelled pots or buckets if intended for keeping.

19. If the butter is to be made into pats, make it up into perfectly plain "bricks" of a convenient size and weighing 1 lb. each. This can be done quickly and efficiently with the Scotch hands, and a butter moulding machine is not necessary, unless large quantities such as two or three hundred pounds per week are to be made up. Never make up in any other shape for market, or put fancy patterns on the "bricks," except for home use, if so desired.

20. Wrap up the "bricks" of butter immediately in the best butter paper. Paper should only be purchased from the most reliable business houses. Never wrap up in muslin. To wrap up the butter neatly without touching it with the hands, first cut the paper into a size that will just fold round the "brick" conveniently with a lap of about ½ inch and extending 1½ inches beyond the ends. As the "brick" lies on the butter board, place the paper over it so that the "brick" is just in the centre, then pick it up in the paper and fold the paper down neatly as one would in the case of an ordinary parcel. It is most important for commercial purposes that this should be done neatly.

21. If sending to a market, take a clean wooden box, free from any taint or smell of wood (if possible one that will take a given number of "bricks" exactly without leaving spare room). Line the box with butter paper arranged so that the ends will fold over double-wise on the top. Then place the butter in the box, each "brick" in its own wrapping, and fitted in closely side by side so that it cannot shift about. Then fold the paper over the top and close the lid. It is best

not to pack the butter in boxes until some hours after it is made.

22. If it is desired to pot the butter for home use or for cooking purposes, take an earthenware or good enamelled (unchipped) vessel with straight sides (that is, without a neck like a bottle or at least a very wide one). Be sure that it is perfectly clean. Put the butter into it little by little, pressing and packing it down closely so that as few air spaces as possible are left, and from time to time pour off any water that may collect on the surface. For the purpose of packing, use a small wooden implement like a miniature "ram," such as one would use for making the puddle core of a dam; be sure to first scald it and then soak it in cold water before use. When the jar is full, place a sheet of good butter paper on the top of the butter, and cover with about an inch layer of fine dairy salt.

23. If it is desired to pack butter in bulk in boxes or cases, the very best clean new cases only must be used, and they must be free from any woody taint or smell. The case should be neatly lined with butter paper, by placing two long pieces each way of the box, so that the ends fold over on top and completely cover the butter. Then pack the butter in, just in the same way as is recommended when jars are used. Level off the top with the Scotch hands, fold the paper over and nail down the lid. As a rule fresh butter is only sold in this class of package by factories, and the writer does not recommend it to farmers, as the conditions under which they usually have to make their butter hardly make it possible to sufficiently free the butter from butter milk for packing in bulk.

24. So far we have considered the making of butter in winter or, in other words, when the atmospheric conditions allow of the operation being carried right through without interruption. More often than not it is found in summer time that, notwithstanding the most careful over-night precautions with regard to the cooling of cream and water, the butter becomes soft immediately it is churned, and is not in a fit state to be worked. When this is the case, take the butter out of the churn with the scoop, place it on the butter table, and, after collecting it together somewhat into a heap with the Scotch hands, cover it with a clean muslin cloth

soaked in brine, and leave it in a cool place in a draught until the next morning. On the next morning at daybreak it will usually be found that it is hard enough to work and make up.

25. One should never, under any circumstances, try and work butter when it is soft. In the first place the water and butter milk cannot be got out of it, and therefore it will not keep any length of time; and in the second place it will become greasy, and lose what is called the "grain." Good butter, when it is broken, should present a surface like that of a broken piece of cast iron. Greasy butter when pulled apart resembles soft putty.

26. It should be remembered that it is the butter milk which is left in the butter which causes it to "keep" badly. Butter free, or approximately free, from butter milk will always keep for a reasonable time in an ordinarily cool place. It is in order that the butter milk may be more easily extracted from the butter that the process of churning is stopped when the butter is in a granular condition. It is, therefore, important to watch the churning closely, and to see that the butter does not get into a lump. In hot weather a couple of turns of the churn too many may do this.

27. If one has not a butter worker, the butter is usually pounded and pressed on a clean board or dish with the Scotch hands until the water is pressed out. The operation cannot be done nearly so completely as with a good butter worker, and, moreover, there is a liability to "rub" the butter and so destroy the grain or texture—hence the value of the butter worker. If the working is done by hand, all the foregoing precautions must be observed just as if a butter worker were used.

28. In conclusion, the writer would urge the absolute necessity for extreme cleanliness and care in every operation of butter-making, from the care of the cow stalls or kraals to the nailing down of the lid of the case of butter. He would emphasise also the importance of making every effort to have the dairy, the water and the cream as cool as possible in summer. Good butter cannot possibly be made in too high a temperature, but if it can be kept cool and firm till the process of manufacture and wrapping up is complete, and reasonable skill has been exercised, it will withstand a very high temperature for several weeks without serious deterioration.

Citrus Fruit Culture.

SOME OBSERVATIONS

By A. G. Turner, Citrus Adviser.

In the following notes I propose to deal with my travels around Mashonaland and a small section of Matabeleland, with regard to what I have actually seen in the way of citrus culture and the possibilities of the industry.

To begin with, there seems to be a quite erroneous idea abroad throughout this Territory that oranges can be grown on a commercial scale without artificial water, on practically any soil, and more particularly on poor sandy soils. There is no doubt oranges can be raised almost anywhere in Southern Rhodesia, but this is not to say that it would be a profitable undertaking. I have seen plenty of places where the soil and situation are as good for the purpose of citrus culture as could be found probably anywhere in South Africa, but at such places it would, of course, be possible to irrigate, either by leading the water from a river in an open furrow by gravitation, pumping from a river, putting up a storage dam to catch storm water, or building a dam to store up water from a river or spruit above the desired site. In one instance I came across a farmer who had an ample supply of water from boreholes, but this latter method seems rather doubtful in most places, and not too safe to depend upon.

Many people have remarked to me, "Oh, but I know several farms where oranges are being grown without any water except what they get during the rains, and there is always fruit on them." I invariably reply something to this effect, "Yes, I don't doubt it, but that always having fruit on them more or less all the year round is just what should be avoided." What should happen is that the fruit of any particular variety ought to ripen simultaneously, or nearly so. The only way to achieve this object is to artificially water the trees before blooming time, and after, so that they have strength to set a full crop then, and not wait for the rains to come. If artificial water is not applied, the trees will probably manage to set a few fruit at the proper blooming time, and will bloom again when the first rains come along. A few fruit will perhaps set again, and when the real rains arrive the trees will come out in full bloom and set a crop out of the proper season. This fruit will ripen too late for the overseas export trade, and this is what every orange grower must bear in mind. There is no money in out-of-season oranges, and, moreover, the trees are weakened by this continual cropping. What the planter should aim at is to have, say, three or four varieties—early, medium and late—so that he can keep on consigning right through the export season, which should extend over the months of June to September inclusive.

The citrus orchard should be absolutely the best kept part of the farm, and every detail attended to, otherwise poor crops will be the result.

It seems to be overlooked that a budded orange tree is an abnormal growth, and must be treated accordingly. One must not expect to be able to deal with it as with a gum tree, or even a seedling orange, both of which are natural growths. Now, realising that it is an abnormal tree, it seems to me only common sense to say that it needs more careful training and attention than a naturally grown tree; that is to say, one should follow the lines that have proved most successful elsewhere under similar conditions.

As to the trees themselves, in most cases that I have come across one would imagine the owner was trying to grow ornamental shrubs rather than profitable paying trees, and on this subject I would like to refer readers to the last paragraph of my article on citrus growing in the February issue of this *Journal*, in which I endeavoured to explain how to raise a profitable orange tree from time of transplanting into the orchard. The reason usually given me for these bushy trees is that if the stem is left unprotected it will get sunburnt, but then I say, "Do not leave it exposed to the sun." Paint it from the ground up with whitewash made from good lime and salt—30 lbs. lime to 5 lbs. salt—which will stick there and protect the tree stem. Let the tree make strong growth in the head, as it will do if properly attended to.

I have further been told by farmers that they have been informed that unless this growth is left low down the ground will get dried out. The remedy for this is, of course, to keep the ground well worked up. I may say it is absolutely fatal, sooner or later, to have a dark damp place around the foot of orange trees. This provides an excellent opportunity for the inroads of fungus diseases, whose worst enemies are light and air, while it also makes a good harbour for insect pests. Keep your trees off the ground and have a free circulation of air and light right through them. If there is one thing more certain than another it is that unless orange trees are properly attended to, and are thoroughly looked after, there will be no profitable return from them. I consider there is no branch of agriculture that requires harder work and closer atention to detail than fruit growing. I am speaking from over twenty years' experience, and can assure prospective growers that unless they are prepared to put in real hard work on their orchards, it is better to leave the business alone; but if it is taken up properly, the work will be found most fascinating, and should yield a handsome income to the planter, and be at its best when the children are ready to take over.

Quite a number of farmers have complained of hares damaging their trees. For this I would suggest that they try sprinkling the leaves with commercial aloes—1 lb. to 4 gallons water—and also paint the bark with the same solution. Rancid grease daubed on the trunks sometimes proves effective, but its efficacy is not of very long duration. Another very destructive creature is the orange dog, and for dealing with this pest the most satisfactory way is hand picking. Train a picannin to go round the trees every day and pick the pests off while they are still small and before they commence to do any damage. If the weather is fine, spraying the trees with arsenate of lead—3 lbs. to 50 gallons of water—is effective.

Enquiries are received from time to time as to what preventive measures should be taken in regard to the orange codling moth. Where this pest is in evidence I would suggest the adoption of the following remedial measure, which, *if* *carried out at the right time*, may assist in checking its ravages:—When the first oranges begin to change colour, smear this particular fruit with tanglefoot or some such mixture that will adhere to the fruit without drying up, the object being to catch the moth as it attacks the fruit for the purpose of laying its eggs. I would remark here that unless irrigation is undertaken so as to set all the fruit the trees can bear at the right time of blooming, I am afraid there will not be much chance of checking the pest. Every tree in the grove should be inspected every day, and any infested fruit burned or buried immediately it is discovered.

How to make Kaffir Tobacco Balls.

By THISTLE.

I think planters who wish to make this kaffir tobacco will find the following method gives a quality which natives much prefer. Those balls can be made from the lower leaves, which are often discarded, or from plants late in the season which are still in the green stage. The leaf must not be dry. On picking the leaves the mid rib should be cut out or peeled away. A bundle is then taken and pounded with short thick sticks or a rounded stone, in a wood or iron trough placed on the slope. All the juice as it collects at the bottom is run off into a tin. A handful of the crushed leaf is then taken and pressed tightly into a ball, not more than 3½ inches to 4 inches in diameter, to allow of equal ripening. The ball is then laid aside for a while in the sun to dry the surface, and then it is dipped in the green juice and laid in the sun to dry again. This dipping in juice and drying is repeated three times. The balls should afterwards be laid on a flat stone or on galvanised iron in the sun and allowed to mature for a couple of months, the balls being turned once a week to ensure an even colour and quality.

With a 30 inch rainfall such as we get in parts of Rhodesia, a good catchment area should give a run off of about 15 per cent. of the rainfall, an average catchment 10, and a bad catchment 5. No data in this connection have been recorded in Rhodesia, and as these figures are not based upon measurements taken in this country, but are deduced from data that have been collected elsewhere, they cannot be absolutely relied upon for our conditions here.

The impounding area for our reservoir is a very important consideration. The fall of the valley at the back of the proposed dam embankment should not be very steep, as the impounding area will then be restricted, as also the quantity of water stored for different heights of wall. It is impossible to lay down any hard and fast rule as to the greatest valley fall allowable. The best way to decide this is to calculate the quantity of water likely to be impounded, and from this to ascertain the area that could be irrigated by that water. The return likely to be obtained should then be set against the estimated cost of the scheme, and if that return is likely to prove sufficient to more than wipe out the capital cost of the scheme in (say) 10 years' time, the work, if carefully carried out, could be embarked upon. In this connection it should be remembered that there is more risk attached to a purely storage scheme than there is to a simple gravitation scheme which does not depend upon storage.

To measure the impounding area of a large scheme, a contour survey would be required, but for a small scheme a farmer ought to be able to take the necessary measurements to arrive at the capacity fairly accurately himself. To do this, it will be necessary to flag out the proposed full supply contour of the dam, and this could be done roughly by setting a carpenter's spirit level on a straight edge, and then holding this at the proposed over-spill level for the dam. By sighting along the straight edge, an assistant could be directed to put in flags at points where the straight edge, when brought to the level, cuts the ground. Or this contour could be ascertained by one of the two methods described for levelling in a previous article on small gravitation schemes. This contour line as flagged out will probably be of a more or less elliptical shape, and as it is desirable to ascertain the area embraced, it should be cut up into one or more regular figures such as squares, rectangles or triangles. In transforming the curved lines into straight ones, the straight lines should be ranged out so that the portions cut out from the curved portion should be approximately equal to the portions taken in. To ascertain the area of a square, multiply the length of any two sides together; of a rectangle, multiply the length of one long side with the length of one short one; and of a triangle, multiply the length of its longest side with half the perpendicular distance from that side to the apex. If the sides were measured in feet, divide the product by 43,560 to get acres, and if measured in yards, by 4,840.

Having ascertained the area in acres, the average depth of the water should be found. In a very small work this might be guessed, but in one of any size, more accuracy is desirable. This might be ascertained by means of a pole marked off in feet and inches, from which a large disc should be suspended on an endless cord passing freely through pulleys fastened at the top and near the bottom of the rod. By sighting across from one of the flags on the top water contour to an opposite flag, the rod being at a point between, the disc could be raised or lowered until the centre of it is cut by the eye at the correct level, and the depth then ascertained by the person holding the rod. These depths should be ascertained at several points at regular distances apart in lines ranged out across the valley. In ascertaining the mean depth, all the recorded depths should be added together and divided by the number of observations taken. In doing so, it should be borne in mind that observations will be necessary at the edge of the proposed top water level, where the depth will of course be zero, for unless these zero depths be taken into account, the correct mean will not be obtained.

Having now found the mean depth of the water in feet, multiply this by the area of the top water surface in acres, and the product will give the capacity of the proposed reservoir in acre feet, *i.e.*, in quantities equivalent to layers of water one foot deep, with a surface area of one acre. The acre foot is the best measure when dealing with the capacity of a reservoir for irrigation purposes. For instance, assume we have found the area of the full supply water surface of our proposed reservoir to be 10 acres, and the mean depth to be 6 feet, we would have 60 acre feet available with the data full. Assume we expect to have to give an annual watering to our irrigable land equivalent to a layer of water 2 feet deep upon each acre, *i.e.*, 2 acre feet. Now, leaving absorption and evaporation losses out of the question for the present, it will be obvious that if our dam contains 60 acre feet and each acre requires 2 acre feet, we would be able to irrigate 30 acres from one emptying of the dam. In irrigation an acre foot of water is a visible measurement, which is more than can be said of gallons. In dealing with water furrows the cusec (cubic foot per second) is used. There being 43,200 seconds in 12 hours, a cusec would supply 43,200 cubic feet in that time, and as there is 43,560 square feet in an acre, it will be seen that 1 cusec flowing for 12 hours is approximately equivalent to 1 acre foot, *i.e.*, 1 cusec would cover 1 acre nearly 1 foot deep in 12 hours, or 4 acres 3 inches deep, and so on.

Before deciding upon the area we may expect to irrigate, the influx of water to the dam during the dry season would have among other things to be considered. In the writer's previous article on gravitation schemes, there are given four methods of measuring the flow of streams, and any farmer desiring to do so should from that article and this have sufficient data to work upon to ascertain the value of any inflow of water he may have to his dam. (See Bulletin No. 64.)

We may now consider the question of silt. In Southern Rhodesia, the writer does not expect this need ever become so serious a problem as in more arid countries. The dense grass which covers the greater portion of the face of this Territory prevents the water running off the ground from attaining a velocity sufficient to carry any but the very finest silts in suspension. When the rains fall on burnt veld or bare cultivated ground this does not apply, and here and there one sees the ruinous effects of erosion due principally to the first-mentioned cause. The problem of erosion is not yet a serious one with us, but nevertheless it is one to be treated seriously by every owner of land, as it is a comparatively simple matter to deal with it in its early stages, but later on remedial efforts may be financially impossible. (An article dealing with the problem of soil erosion will be found in the *Rhodesia Agricultural Journal*, Vol. X., No. 5, page 667.)

A small quantity of silt in a reservoir is not altogether a disadvantage, as it renders the bed more retentive, but if a large amount enters annually the capacity of the reservoir may become seriously reduced. In a large scheme the silt would be ascertained by measuring the proportion carried by the stream by means of silt boxes, but as the question is not of serious moment for small schemes, having drawn attention to the matter, we shall pass on.

Another and serious problem is the loss of water due to evaporation and absorption. The following table gives the evaporation losses so far as recorded by an evaporimeter at the Cleveland Reservoir, Salisbury, during the year ended 1913-14:—

Month.		Monthly total (inches.)	Mean daily (inches.)
1913.			
July	...	5.64	0.18
August	...	7.51	0.24
September	...	8.96	0.30
October	...	12.72	0.41
November	...	9.32	0.31
December	...	11.81	0.38
1914.			
January	...	8.60	0.28
February	...	4.86	0.17
March	...	9.14	0.29
April	...	7.81	0.26
May	...	5.87	0.19
June	...	4.82	0.16
		97.06	

The evaporation, judged from the above figures, apparently amounts to about 8 feet per annum. The evaporation loss need only be taken into account during the seven dry months April to October, which, as recorded for Salisbury, amounts to about 4 feet. In Bombay, it is usual in the case of large projects to allow for a total evaporation and absorption of 4 feet measured at the mean area of the reservoir, although in some cases allowances as low as 3 feet and as high as 7 feet have been made. The seriousness of this question cannot be too carefully pondered over, especially when contemplating storing water from the wet season for the dry, and when there is no counteracting inflow to the dam during the dry months.

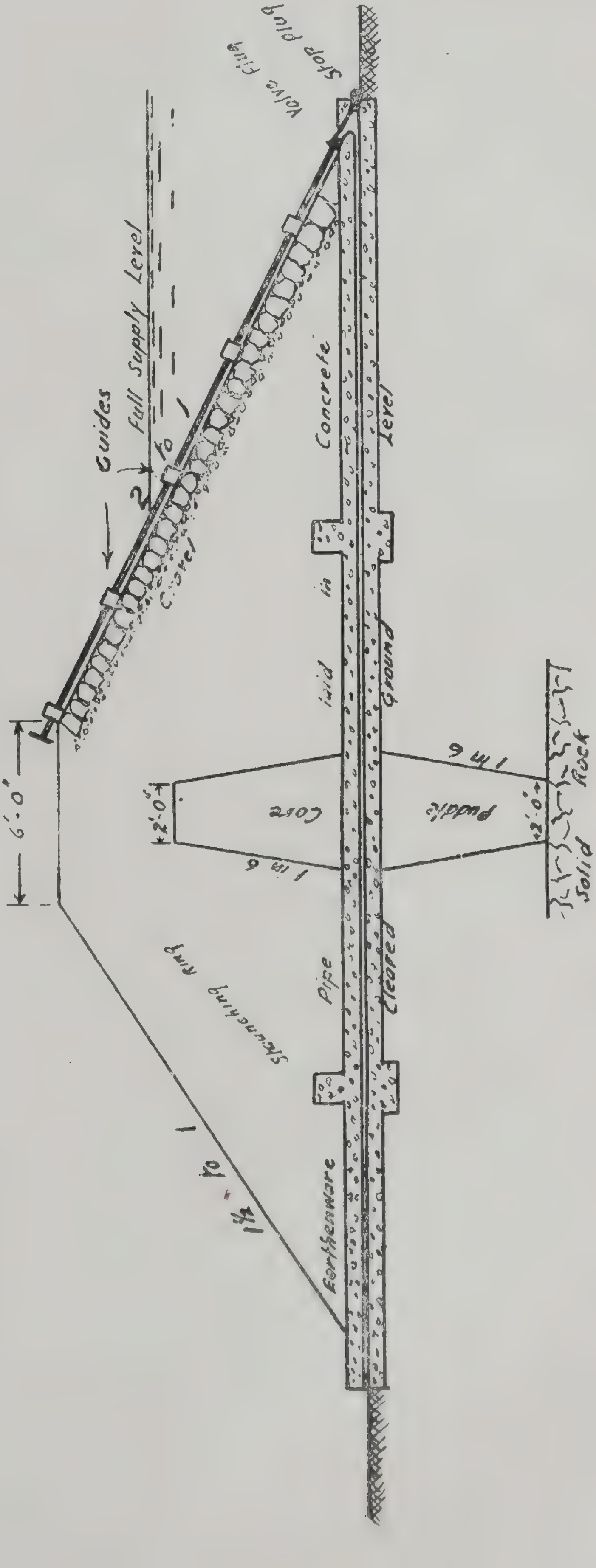
The next source of loss to be considered is that from absorption, but no accurate estimate of this loss can be made until after the work has been carried out. The only thing that can be done to reduce it is to take great care in the material used, and in the proper construction of the wall, and also to see that it is founded on as sound and impermeable a foundation as possible.

We might now endeavour to make an estimate of cost of our works. The main items of cost may be considered to be (1) excavating for the puddle core, (2) clearing the ground for the foundations, (3) filling the puddle core, (4) earth filling for the embankment, (5) pitching the embankment, (6) waste weir, (7) outlet, and (8) compensation for land submerged. Items (1), (2), (3) and (4) should be worked out in cubic yards, and a price placed against each, according to what the farmer thinks each cubic yard of the finished work will cost. It would only be misleading to furnish even average rates of cost for the different items, as they will vary in almost every individual case, chiefly owing to the class and cost of labour, the hardness of the ground and its proximity to the work, whether dam scrapers are used, and so forth. The cost of item (5) will depend upon the facilities for getting the stone, the distance it is away from the work, etc. Item (6) will depend upon the nature and quantity of the material to be excavated. The cost of item (7) will consist chiefly of the prices paid for piping, valve, etc., which could be ascertained from the merchants. No. (8) will, of course, only be incurred as a cash transaction, if another owner's land is to be submerged.

Having arrived at our estimate of cost, the probable return from the irrigable land should be thought out, and the remarks in this connection in a previous article on small gravitation schemes will apply here with equal force.

Should we decide upon the undertaking, we might now settle upon the section of our embankment. For dams over 15 feet in height a farmer should have professional assistance in designing and constructing, as the bigger the undertaking

FIG. No 1


Stop plug
Valve Flap
Full Supply Level
Guides
2 to 1
Gravel
6'·0"
Concrete
Pipe laid in Concrete
Earthenware Pipe laid in Concrete
Cleared Ground Level
Core
Puddle
2'·0"
2'·0"
1 in 6
1 in 6
Solid Rock
Strengthening Ring
1½ to 1

the bigger are the risks involved, and the larger the sum of money at stake. For dams 15 feet high and under, the following dimensions are recommended:—Top width, 6 feet; up-stream slope, 2 to 1; down-stream slope, 1½ to 1; and a freeboard of 1½ to 5 feet (*i.e.*, the top of the dam to be 1½ to 5 feet above the highest estimated flood level, according to the height of the wall). A slope of 2 to 1 means that for every foot in vertical height the base of the slope will be increased by 2 feet, a slope of 1½ to 1 that for every foot in height the base will be increased by 1½ feet, and so on. Such a dam is shewn in the accompanying sketch.

It will now be desirable to peg out the base of the dam, as its bottom width will vary with the height. If the top length of the dam is not very great, this could be done by tightly stretching two wires or two lengths of strong cord across the valley at the level intended for the top of the dam. Measuring poles held vertically alongside the wire or cord will enable the height of the proposed bank above ground level to be ascertained and from this the base. For instance, if the up-stream slope be 2 to 1, and the rod held vertically alongside the up-stream wire shews at one point a height of 10 feet, if turned over horizontally at right angles to the centre line of the dam, a peg put in on this line at 20 feet would give the toe of the base at that point. This operation may in the first instance be carried out roughly to ascertain the area of ground that has to be cleared of growth, roots, etc., and then repeated more accurately so that the base for the new work may be exactly determined.

If a puddle core is required, a trench should next be carried down to rock or to some impermeable ground. The bed of this trench should be roughened so that the puddle can bind with it and the sides and bottom of the trench be slightly wetted before adding the puddle. The material for the puddle should be the fattest and most retentive clay obtainable within a reasonable distance of the work. Some of our antheaps afford material suitable for this purpose, but any material having much grit or any excess of lime should be discarded. The puddle should not be wetted more than necessary to render it impermeable. It should be kneaded in balls and thrown into the trench, and the whole work carried out with as much expedition as possible, to prevent cracking. The puddle should be stamped or rolled so that no airholes are left in the work. Should there be any water in, or entering the puddle trench, this should be pumped out or drained off. In carrying the puddle above ground level, this should be done simultaneously with the earthwork filling to the embankment. A suitable section for a puddle core is shewn in the accompanying sketch.

Before starting the earthwork filling, it will be desirable to place two or more batter planks in permanent position on each slope of the embankment as a guide in keeping a uniform and correct profile. These batter planks can be erected by lashing them to a peg on the ground at the toe of the embankment and the correct slope given to them, when they might again be lashed to a peg driven firmly into a mound of earth 4 or 5 feet in height. It will not be necessary to carry the planks at once to the full height of the work, as they can be advanced as the earth filling proceeds. A line held at the back of any point on one batter plank will give the correct batter of any point on the face of the slope by moving it up or down behind the other batter plank. By this means the profile of the slope of the wall will be kept uniform and have no unsightly billows and bulges in it. No earthwork for the filling of the embankment should be taken from either side of the bank nearer to the toe than a distance equal to the height of the finished bank.

It might be advisable to point out that giving a convex curve to the up-stream side of an earthen dam embankment is of no practical value in adding to its strength, and only entails a larger quantity of earth filling. There are a large number of arched masonry dams in existence—notably the Bear Valley and Sweetwater Dams in America, but between masonry or concrete and earthwork there is a vast difference. The efficacy of an arch when pressure is applied to it depends partly upon the power of the material of which it is made to transmit thrust to the flanks. Before an ordinary earthen dam wall could do this, it would have to become compressed until it was a much more solid body than it ordinarily is, and in the course of this compression it would be sliding on its base, and this would mean certain disaster.

In raising the embankment, the earth filling should be laid in layers not exceeding 6 inches thick, and each layer properly consolidated, by rolling or by stock walking over it, before the next succeeding layer is applied. The reason for the thinness of each layer will be obvious to anyone who cares to try and consolidate a layer of earth 6 feet thick. Before the next layer is applied the ground upon which it is to be laid should be slightly wetted, so that the new work can bind. The earth filling can best and most economically be done by means of dam scrapers worked by mules or oxen. This method has the further advantage that the animals walking over the work tends to consolidate it.

In repairing an old dam, the surface of the old work should be stripped and shelved so that the new earthwork is dovetailed and has a reasonable opportunity of binding with it. Furthermore, the sides of the old work should be slightly wetted before adding the new.

No material should be used in the dam which contains organic matter or much calcareous matter. The former will rot in time, and either leave holes in the work or cause undue settlement, whilst lime prevents the earthwork from binding properly.

When any wave action is anticipated, the water slope of the dam should be pitched with dry stone. This stone should be placed on end or edge with its flat planes perpendicular to the slope. Instead of laying this pitching on the earthwork, it is customary in good practice to lay it on a layer of gravel or shaly material, as this prevents the waves and water which get through the voids in the pitching from washing away the earthwork. If the earthwork becomes washed out, there will be the danger of the pitching subsiding.

The down-stream side is also frequently pitched with stones to prevent erosion of the slope by rain, but in the case of small dams it will be quite satisfactory and more economical to plant some grass, such as "quick," which should bind the earth and prevent erosion.

We may now consider the waste weir. This should be so designed as to be capable of carrying off the largest probable flood with a low depth of water over the crest. This means that the overflow channel should be wide and shallow in preference to being narrow and deep. Insufficient wasteway accommodation is one of the most frequent causes of failure of earthen dams, and any undue stinting of expenditure in this direction is false economy. In estimating the accommodation necessary, it should be borne in mind that we have to provide for passing the greatest possible flood.

The following table should serve as a guide to the extent of wasteway accommodation necessary for different sized catchment areas. It has been adapted from data contained in Strange's work on "Storage Reservoirs," which, while based upon the monsoon rainfall of the Himalayas, would approximate to the conditions prevailing in this Territory. It will be noticed that the maximum flood discharge, and hence the length of waste weir, does not vary directly as the catchment area. This is due to the fact that the larger the catchment, the less likely is it that the rainfall will be equally intense over the whole area at the same time:—

SIZE OF WASTE WEIR CHANNELS
(Fall, 1 in 100).

Area of catchment in square miles.	Probable maximum flood. Discharge in cusecs.	Length of wasteway in feet, with 2 feet depth of water.
1	192	26.3
2	358	49.2
3	507	69.6
4	636	87.0
5	755	102.4

The above table only gives the discharge of wasteway when passing 2 feet of water; for different depths it will be found from the following table, which gives the approximate discharges of a waste weir channel having a bed width of 20 feet and a bed slope of 1 in 100:—

Total depth in feet.	Mean velocity of tail channel. Feet per second.	Discharge in cusecs.
1	3.40	47
2	5.78	145
3	7.78	274
4	9.66	444
5	11.42	651
6	13.03	878

Waste weir channels having a greater or less bed width may be found proportionally. For instance, a 10 feet bed width would give discharges of approximately one half, and a 40 feet bed width approximately double that given in the table. The waste weir channel should be in solid ground, or, if not, should be pitched with dry stone placed on end. While the foregoing tables give the discharges for different depths over the spillway, it must be borne in mind that these depths do not imply that this is the actual difference of level between the top of the dam and the cill of the spillway. An extra difference of at least 2 feet should be added to the figures in the table, to further ensure against the risk of the embankment being topped. This is termed the "free board" of the dam. A further safeguard may be obtained by keeping the centre of the embankment higher than the flanks, so that in the event of the spillway proving insufficient, the ends of the wall would be breached first instead of the centre and most expensive portion. A protective training embankment may also be necessary to prevent the overflow water from damaging the main embankment.

Another common source of danger is the outlet pipe. This danger can be entirely obviated by drawing the water from the dam by means of a siphon over the embankment. At our altitudes in Rhodesia a siphon should not be expected to work satisfactorily over banks higher that 20 feet. The inlet of the siphon should be a few inches below the lowest level at which it is proposed to draw off the water, and the outlet should have as much fall below the inlet as may be available. Before it will work, the siphon must be primed with water. This can be done in the case of a flexible hose pipe, which should be armoured, by plugging one end and filling the tube with water, when the other end should be plugged. One end should then be inserted in the water and the plug withdrawn, the outer end should then be lowered below the water lever, when, if the outlet plug be withdrawn, the water will flow through the siphon.

In iron or steel siphons, the ends of the legs of the siphon should be fitted with stopcocks, and the siphon primed by pouring or pumping water into a tee piece fitted in to the siphon at the summit. When the siphon is full, the tee should be plugged and the stopcocks opened, when, if all joints in the siphon are air-tight, the water will flow out of the dam.

When the outlet pipe has to be passed under the embankment, the greatest care should be taken to have it well founded, so that there can be no settlement. A rock foundation is preferable, but in any case the pipe should never be carried through the bank itself, but should rest upon undisturbed ground. The pipe should be covered in a ring of concrete and supplied with concrete staunching rings as shewn in our illustration. Where the foundation is of earth, the pipe should rest on a good broad footing of concrete, to minimise any tendency of the pipe to settle.

A common practice amongst farmers is to place the valve at the outlet end, and where the work is not very large this method may be adopted. It is, however, preferable to have the valve at the inlet end, so that in the event of anything going wrong with the pipe, the water could be shut off from it and the matter remedied. A valve answering in this manner suitable for banks not higher than 10 to 12 feet is shewn in our sketch. In works of greater magnitude, the usual practice is to construct a headgate or valve tower in the water above the inlet, so that the valve or valves can be opened vertically. An approach bank and bridge are then constructed, so that the operator can have access to the headgate or tower from the top of the embankment. In the case of the tower, one has the advantage of being able at any time to inspect the valves and gearing.

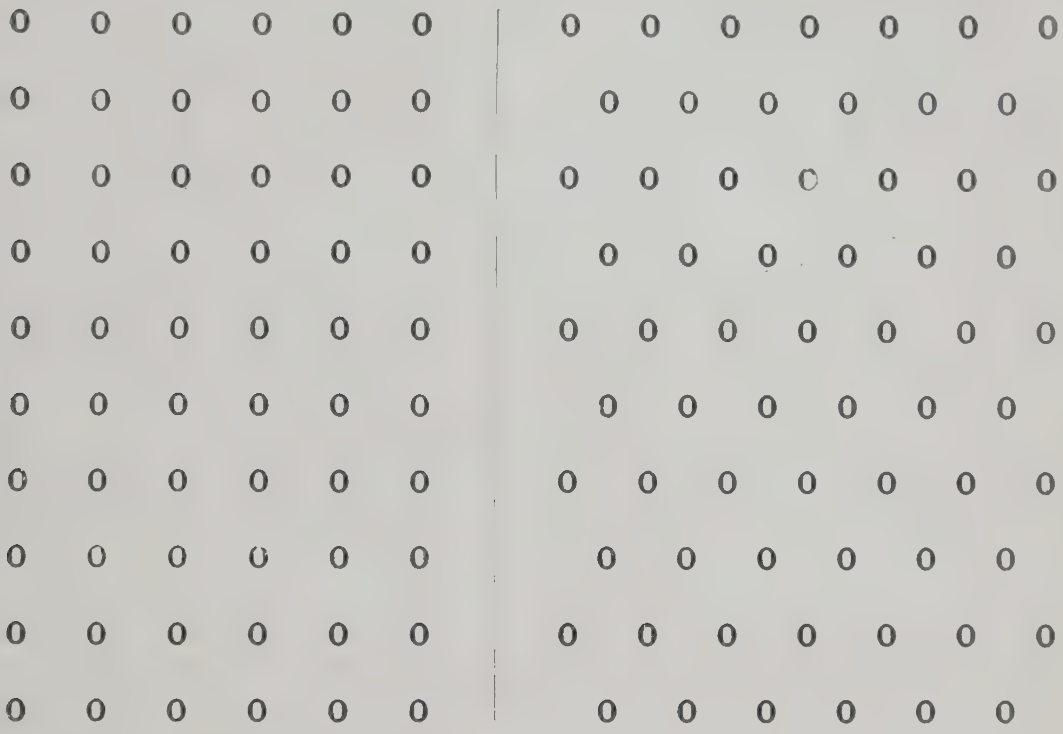
Should the dam have been constructed for the purpose of watering stock, it is strongly recommended that the dam be fenced off and the water led out of the dam into drinking troughs. To permit animals to wallow about in the dam itself is only making provision for the easy dissemination of disease.

Citrus Fruits in Rhodesia.

PLANTING OPERATIONS.

By A. G. Turner, Citrus Adviser.

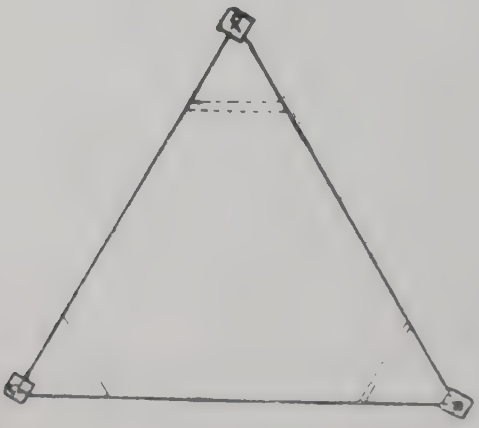
Assuming that a suitable site for an orchard has been selected, and that the land has been thoroughly cleared of trees, stumps, rocks, etc., and has also been levelled so as to admit of water being led over the entire block, it should now be in a condition ready to lay out for the permanent orchard. If necessary, windbreaks should already have been planted. Unless the land for planting has been really well worked up, it would be much better to plant a crop of some kind instead of laying it out at once to fruit trees. Maize, being a useful crop to open up the ground, can be grown to advantage, but if the soil is inclined to be poor, it would pay better to plant a leguminous crop in the spring, which would be ploughed under in the summer when in bloom and left to rot in the ground. It is very desirable that the trees should stand in straight lines, both for convenience and symmetry, and this can be achieved in many ways of laying out an orange grove, but I only propose to deal with two methods, namely, the square or rectangular system, and the hexagonal or equilateral triangle system. The accompanying sketches shew the difference between the two systems:—



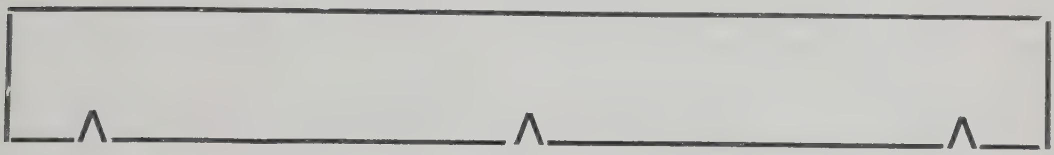
On the square or rectangular system trees planted at 20 feet will give 108 to the acre, at 22 feet 90, and at 24 feet 76. This system allows more room for each individual tree than any other, and also gives better opportunities for ploughing, cultivating and irrigating than any other method. Planted on the hexagonal or equilateral system at 20 feet apart, there are 126 trees to the acre, at 22 feet 103, and at 24 feet 86. The trees stand equi-distant from one another right through, and economy of space is thus secured; but, on the other hand, there are not the same facilities for general work. Therefore, on the whole the most satisfactory system is the square or rectangular. A measuring wire or chain is the best means for getting accurate location of trees, and this can be made from two or three strands of ordinary baling wire twisted together. The wire must have been previously thoroughly strained, otherwise it will be liable to stretch when in operation. At each end of the wire a strong ring should be attached, and along the wire at every 20 feet, or whatever distance it is decided to plant at, a piece of red cloth, copper wire, or any distinctive material, must be inserted by separating the strands and made fast so that it cannot slip.

The Square System.—First of all mark out the base line, which should be about 100 feet from the windbreak and parallel to it, by stretching the measuring wire at the required distance from the windbreak or boundary line. Place a stake at each of the distance tags on the wire, and these stakes will represent the first row of trees. The next thing to do is to find a square corner, which is easily done by marking off 80 feet on the base line, and then at a point 60 feet as nearly at a right angle to the base line from the corner stake as the eye can judge. If it is found that the distance between these two points first taken is 100 feet, a true corner will be obtained. Continue this line the whole length of the land to be planted and mark it off with the measuring wire at the desired distances. Repeat the same operations from the other end stake of the base line, which will give two parallel lines on opposite sides of the land. All that has to be done then is to connect up the first stake on each line with the measuring wire, and place a stake at each distance tag right across the land, and continue this operation right down the field. All the stakes must be set on the same side of the wire.

THE HEXAGONAL SYSTEM.—It is possible to lay out an orchard on this system by making a strong wooden frame, triangular in shape and equilateral, having the exact dimensions required and holes provided at each corner, as shewn in the diagram. The best way to get these holes correct is to fix one-foot-square planks firmly at the apices with one inch hole bored, so that the inner ring of the holes exactly touches the point of the triangles. Lay off the base line as directed in the other system. Three men must then carry the frame, which is moved down the base line and placed over the stakes in place thereon, the apex of the triangle pointing inwards towards the land to be marked out and a stake driven in through the hole there.



The orchard having been laid out according to the system decided upon, the next operation is to mark out the position of the holes to be dug, for which purpose it is advisable to use what is known as a "planting board," as shewn below. This is easily made from a piece of flooring board 5 feet long by 5 or 6 inches wide, a notch being cut exactly in the middle, and also at either end. The two outside notches must be exactly equi-distant from the centre notch.



The idea in using this board is that the rows of trees should correspond exactly with the stakes in the original lay out of the orchard.

In the operation of digging the holes, the centre notch is placed right up against the stake, which represents the spot where the tree is to stand, and a stake is driven into the ground at either end notches. The centre stake is then removed and the hole dug, care being taken not to shift the two outside stakes. Holes can be dug 2 feet deep and 2 feet 6 inches across, and even to a lesser depth, provided the ground has been previously well worked up. In digging the holes the surface earth should be set on one side and the lower soil on another, the object being to have the top soil to place in direct contact with the roots when the tree is planted; the lower soil is used to fill up the hole with. Besides its use in bringing the trees into line, the planting board enables one to judge of the correct depth of setting the tree as compared with the surrounding ground, which is not easy to determine by eye if the hole is a large one.

When the time comes for planting, the soil that has been taken from the surface should be put back into the hole and brought up to a conical shape, so that the centre of the tree will stand on the top of the cone. Now take the planting board and set the two end notches exactly and closely against the two stakes, then take the tree, the roots of which should be trimmed with a sharp pair of shears in order to remove all that may be bruised or broken, and hold it firmly against the centre notch so that it stands on top of the cone of earth that has just been thrown up. More top soil is thrown in until the roots are well covered, and the planter then carefully works this earth into the roots with his fingers, which do this job better than anything else. When the roots are all well covered, remove the planting board and get into the hole, tramping the earth well all round, taking care not to damage the roots. Then fill in a little more soil and fill up the hole with water. If the ground is of a very porous nature, or very dry, it is advisable to fill up the hole twice at least with water. Finally, when all the water has soaked away, fill up the hole to the level of the surounding ground with dry soil and do not tramp it. When the job is finished, the tree should be standing a couple of inches higher than it originally stood in the nursery, as with the sinking of the soil it will be found the tree is standing about as it did in the nursery. The mark where the tree stood in the nursery is always quite well defined.

After planting, the top of the tree should be cut back to about 24 inches and the stem painted over with whitewash, made by mixing 30 lbs. lime and 5 lbs. salt with enough water to make it flow well. Water should be given when needed, and it is best applied by removing the top layer of soil and repeating the same operation as at planting time for the first few months. The ground around the tree must be kept loose and not allowed to pack.

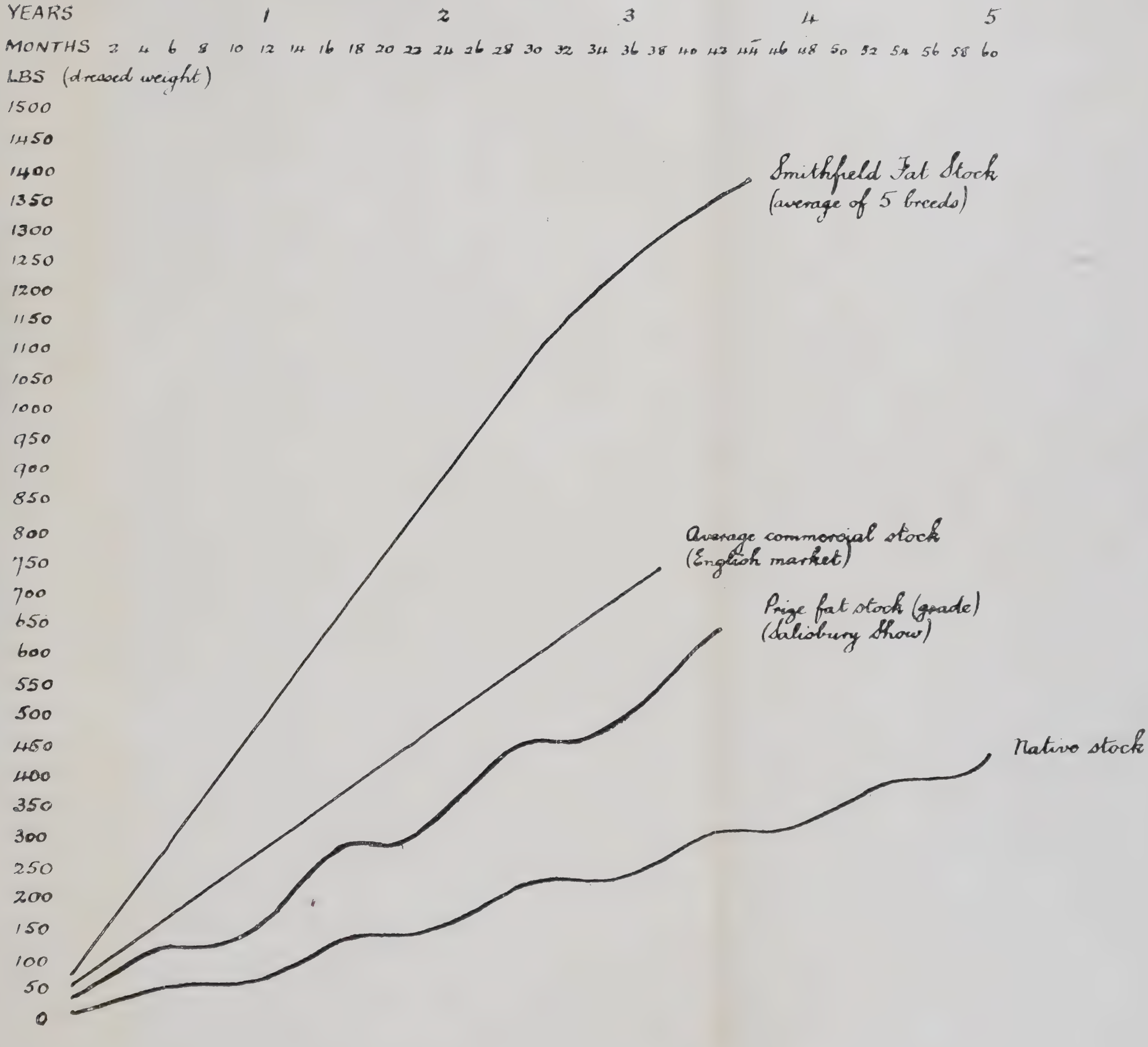


Diagram showing the approximate growth of English Fat, and Commercial Stoc
Rhodesian prize fat 'grade' stock, and Native cattle.

Water in the Diet of Live Stock.*

By Ll. E. W. Bevan, M.R.C.V.S.

At the present time, when we are enjoying a bounteous rainfall, it is difficult to recall the serious period of drought from which we have but recently emerged, or to contemplate that upon which we shall shortly be entering. In order, therefore, that we may make the best use of water when we have it in abundance, and may take steps to conserve it for use when it is less plentiful, a few timely notes on the importance of a good and sufficient water supply in the raising of stock may be of value to readers of the *Journal*.

One of the prime necessities for the preservation of health and condition in animals under domestication is a good and plentiful supply of water. "Pure water," that is to say, water without any substance in solution or suspension, seldom if ever occurs under natural conditions, but "good water" in the hygienic meaning of the term, that is, water which is colourless, tasteless, odourless, not too hard and without organic impurity, is procurable on most Rhodesian farms.

It is not proposed to deal at length with the *mineral impurities* which our waters commonly contain, since these are generally insufficient to bring about any harmful effect.

Accidents are occasionally reported from cattle drinking in the neighbourhood of mines, but deaths due to arsenic and the contamination of the drinking supply by "cattle dip" are all too frequent, and it may be well to reiterate here the warning which the Chief Veterinary Surgeon found it necessary to publish in a previous issue of this *Journal,* pointing out the dangers associated with the careless handling of this poisonous drug.

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* The above is the title of an address recently delivered by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., to the farmers of South Australia, and containing so many points of practical interest and importance to the Rhodesian stock-owner that much of it is here reproduced for the benefit of our readers.

The *organic impurities,* however, must receive closer attention. They are of two kinds—animal and vegetable. The latter are not as a rule serious, unless in large quantities; they usually result from plants growing in, or leaves falling into, the water. They may affect the colour and taste, but living vegetable matter is seldom injurious; indeed, by its oxidising powers it may to some extent tend to purify the water.

Animal impurities are again of two kinds:—(1) those emanating from healthy men and animals, (2) from men and animals affected with some specific disease. The first are objectionable on account of their bad smell and taste, and also from the injurious effects on the animal's body from the ingestion of the solutions of animal materials.

On the other hand, water is contaminated by impurities, such as the excreta from diseased animals, which may convey infection to those partaking of it.

Some of the *pathogenic organisms* which may thus be derived from an impure water supply may be briefly referred to.

Fortunately in this country many of the microbial diseases which elsewhere are water-borne, such as glanders, anthrax, swine fever, foot and mouth disease and rinderpest, do not at present exist. One disease, however, which has been recently introduced into this country, namely, contagious abortion in cattle, may be contracted by the pregnant female in drinking the water contaminated by the discharges containing the specific bacillus from a cow which has previously aborted.

Parasitic diseases, however, are much more commonly spread in this way. The eggs of the tapeworms and wireworms have frequently been found in polluted water, and the liver fluke depends upon a water snail living in or around wet places.

On a great many farms during the dry season, the only water available for stock is limited to that remaining in dams and water pools, and this becomes so highly polluted by the excreta of animals constantly collected around it or actually standing in it, that it eventually constitutes a veritable death trap. A single animal infected with intestinal parasites, such as tapeworm or wireworm, will deposit in its fæces many thousands of eggs, which will find in the moisture of such places conditions favourable for existence, until they are taken up by a suitable host in which they can multiply and continue their life cycle. When it is remembered that a few eggs developing into mature parasites may give rise to many millions of eggs, which in turn pass out in the fæces of the infected animal, it is easy to understand how highly dangerous such water is, and how whole flocks and herds may eventually become infected by drinking it.

Such parasites, once established in their host, produce their ill effects in an insidious but none the less disastrous manner. Many of them do so by simple mechanical crowding or by setting up a continuous irritation, and so interfering with digestion. Some derive from their hosts the products of the processes of digestion; those possessing a digestive apparatus ingest these materials, others more simply organised absorb them by osmosis. Others extract large quantities of blood, and so cause anæmia, while others again give rise to toxins or poisonous substances harmful to their hosts.

It is possible that an animal otherwise in good health may for a long time resist or tolerate these parasites, but when unfavourable conditions such as those associated with the dry season and prolonged drought reduce its vitality and powers of resistance, it falls a victim to the constant demands of its invaders, or becomes the easy prey of other diseases to which its enfeebled condition renders it unusually susceptible.

It is easy to understand that an animal continually robbed of the material necessary for nourishment and maintenance has not that surplus necessary for growth and cannot thrive and develop as a healthy animal; and since it is the aim and object of every stockman to produce meat or milk for the market, these parasites are, apart from the actual death of animals, a source of considerable financial loss to him.

The amount thus lost in this country must be enormous. It may truthfully be said that scarcely a sheep exists in

Rhodesia which does not harbour one or more species of intestinal worm, and this to a large extent explains the fact that we are compelled to import annually from without more than £50,000 worth of mutton for local consumption. Fortunately cattle are not so frequently affected, but during the past year on one estate alone three hundred head died either directly from verminous infestation or indirectly from the result of diseases associated with it. Both cattle and sheep have died from "fluke," which has become widely established during recent years. Horses, mules and donkeys also suffer from intestinal parasites.

It must be remembered also that temporary collections of water are most favourable for the breeding of mosquitoes, which transmit malaria to man and possibly horse-sickness to equines, and the experience of the present season clearly shews the necessity for taking every precaution against these deadly diseases.

Enough has been said to indicate the dangers associated with impure waters: let us now discuss the benefits to be derived from a good and plentiful supply.

"If we recall that water is of the very greatest importance for the normal physical condition of the tissues, that the solution of numerous bodies and the dissociation of chemical compounds, that all flow of juices, all exchange of material, all supply of food, all growth or destruction, and all removal of destructive products, are connected with the presence of water, and that besides this the water by its evaporation is an important regulator of temperature, it is evident that water must be a necessity of life." (Hammersten.)

Or, as explained by Mr. Place in the address previously referred to, "Water is of the highest importance in all the processes of change in the animal body which are spoken of as life, and it is especially so in the processes connected with digestion. It helps in chewing; by it the food is rendered fit to be absorbed by the bowels; it is the chief carrier of nutriment to the system, for without a sufficiency the blood is unable to utilise the food offered to it; its evaporation by the skin and lungs is one of the chief means of keeping the body at a suitable temperature; and its presence is absolutely necessary in the metabolism of the food, those intricate changes which transform the vegetable cells into fit food for animal tissues by such marvellous processes that even the balance of the chemist is not able to check the minute alterations that take place. When water is not present in sufficient quantity, the processes of digestion are slowed down, and those of waste removal checked, so that poisons form in the system which would not otherwise do so, and the products of protein digestion rapidly change into virulent poisons. When the blood is too thick from loss of water, the body temperature rises and the system becomes more liable to attack by those poisons, and the young, both before and after birth, are seriously crippled in their struggle for existence, while thirst diminishes the desire for food, purging, vomiting, paralysis ensue, and death does not loiter on its way."

The animal body is made up of proteids, fats, salts, water, and a very small proportion of carbohydrate. Every food must either contain these principles, or be capable of conversion into them within the animal body.

The following table from Lawes & Gilbert shews the relative proportion of these in oxen, sheep and pigs in store condition:—

	Ox.	Sheep.	Pig.
Water … … … … … … …	60.8	63.5	61.2
Proteids … … … … … …	18.0	15.0	14.0
Fat … … … … … … … …	16.0	18.0	22.0
Ash … … … … … … … …	5.2	3.5	2.8

The quantity of the water in the organism decreases with increasing age, a fact of practical importance, and to a large extent explaining the "leathery" condition of the meat derived from the worn out trek ox or antiquated cow frequently supplied for local consumption, and emphasising the necessity for producing a class of cattle of earlier maturity than we possess at the present time.

The quantity of water in different organs varies. While the enamel contains only 2 p.m. water and the teeth about 100 p.m., the fatty tissue 60-120 p.m., the bones 140-440 p.m., and cartilage 540-740 p.m., the muscles, blood and glands are far richer, containing from 750-800 p.m.

The following table is collected from figures published by Lawes & Gilbert at Rothamsted, England, and from experiments conducted at the Maine Experimental Station:—

Water in Entire Body.

Ox, well fed	L. & G.	66.2	per cent.
Ox, half fat	,,	59.0	,,
Ox, fat	,,	49.5	,,
Steer, 17 months old, medium fat	M. E. S.	59.0	,,
Steer, 17 months old, medium fat	,,	56.3	,,
Steer, 27 months old, fat	,,	51.9	,,
Steer, 27 months old, fat	,,	52.2	,,
Calf, fat	L. & G.	64.6	,,
Sheep, lean	,,	67.5	,,
Sheep, well fed	,,	63.2	,,
Sheep, half fat	,,	58.9	,,
Sheep, fat	,,	50.9	,,
Sheep, very fat	,,	43.3	,,
Swine, well fed	,,	57.9	,,
Swine, fat	,,	43.9	,,
Chicken flesh	,,	74.2	,,
Fowl flesh	,,	65.2	,,
Goose flesh	,,	42.3	,,
Turkey flesh	,,	55.5	,,

Thus we learn that considerably more than half the body weight of the calf and nearly half that of the fat ox is water. In extra-fat sheep the water content falls to 43.3 per cent., the lowest of all farm animals, while for the fat pig it is 43.9 per cent. Generally speaking, about half the weight of the bodies of our domestic animals is made up of water—a fact which should appeal to the pocket of every Rhodesian stockman.

It may, however, be noticed that in the above table the lean animals contain a much higher proportion of water than the fat, but this must not be taken as a justification for starvation. "It does not mean that in the process of fattening, the fat is substituted for water, and so expels it from the organism.

but that the increase has a much smaller percentage of water than the body in its original lean condition." (Bailey.) It explains to some extent the common experience that in fattening an animal, more is required to "set it going" than to maintain it when once in good and thriving condition.

The Rhodesian year is made up of two seasons, the wet and the dry, the former characterised by an abundance and often an excess of water and succulent feeds, the latter by an absence of natural green-stuff and often a serious shortage of water. During the greater part of the wet season our cattle are well fed, fat and make good growth, but during the rest of the year, which is roughly about five months out of the twelve, this condition is lost; the animals cease to grow, and not infrequently die from starvation and inanition.

"When an animal is starved, it lives on its own tissues. If water be given, life is considerably prolonged. Colin records a case where a horse receiving water lived thirty days without food. It is notorious that herbivora, though they lose less proteid during starvation than carnivora, do not withstand starvation so well. It has been found by experiment that old animals bear starvation much better than young growing ones, as their requirements are smaller." (Smith.)

During starvation water passes uninterruptedly from the body, even when none is taken in. *This is obtained from the tissues themselves;* indeed, "the liberation of water from the tissues is generally sufficient to supply the loss of water, and starvation is ordinarily not accompanied with thirst." (Hammersten.) If, then, during the dry season, with the shortage of food there is also an inadequate supply of water, the demands upon the animal body are intensified, and the damage wrought is often irreparable. In other words, animals which receive a check seldom entirely recover from it. Unfortunately, in this country, while cattle make quite exceptional growth during part of the wet season, they frequently "stand still" or actually "go back" during four months of the dry season, and take another four months to recover what they have lost. Thus we do not get the early maturity and the tender meat of stock which are "kept going" all the time.

When at our local fat stock shows an exceptional fed grade animal of 3½ years yields 600 to 700 lbs. dressed weight, it has no difficulty in beating the hardy veterans competing against it. Our native stock is still growing at six years, and seldom reaches these weights when fully grown.

Stockmen are too liable to stock their farm according to its carrying capacity during the summer, entirely forgetting the coming period of drought, and neglecting to provide for the winter either a food or water supply.

In a recent report of the Trades Commissioner in London on a consignment of South African beef (*ex* s.s. "Balmoral Castle") which was placed on the market at Smithfield at the beginning of the first week in December last, and consisting of 100 hind quarters and 200 fore quarters, he says, "The principal lesson to be derived from the experiment is. I think, that a better class of cattle must be produced if ever the Union wishes to enter the meat trade with success. Hanging side by side with Argentine and Australian quarters, the deficiencies in our own meat were too obvious. No amount of dressing or grading can ever compensate for the poor quality and condition of inferior meat, and this lesson should be taken to heart by our farmers."

These remarks refer, it is true, to a consignment of beef from the Union, but the advice should also be taken by the Rhodesian farmer, who cannot hope to successfully compete in the world's markets with beef from animals which have reached a ripe old age, in spite of a vicarious existence of alternating plenty and starvation.

The principal object of every breeder should be to bring his cattle to early maturity, so as to place them on the market as quickly as possible, remembering that *the cost of gain in weight increases and the quality of meat decreases with age.* If a calf born weighing 50 lbs. were to increase 1½ lbs. a day for the first month and 1 lb. a day subsequently until 40 months old, it would then weigh about 1,200 lbs., which, dressing at 60 per cent., would give a carcase weighing about 750 lbs., which is about the weight and quality required in ordinary commercial stock, and, of course, very much below that required in animals for show purposes.

These figures, however, are seldom achieved in this country even in our prize winners. To begin with, our Rhodesian calves seldom weigh as much as 50 lbs. at birth (their mothers having had to weather the dry season during the last few months of the calf's existence *in utero*), and being born in spring they usually contract redwater and gall-sickness, and suffer from anæmia, so that they have not that surplus of blood necessary for growth. Still more unfortunately they wean about the time of the dry season, and are ill able to subsist upon the dry and meagre fare available. With the commencement of the next grass season, when about a year old, they make a certain amount of growth until once more they are checked with the winter shortage of food. Year by year this goes on until by the time they present a marketable size their meat is inferior in quality and quantity, and only suitable for canning or for the local market.

The quantity of water required varies with the different classes of stock, with the climate, season and temperature, with the food and with exertion or exercise. Range cattle require from 4 to 8 gallons a day, but milch cows require a more generous supply, not only for maintenance, but for the production of milk, whether for the calf or the bucket. Cattle, and more especially cows, should have all the water they desire *without being compelled to "trek" long distances to obtain it.*

Horses and mules require from 4 to 6 gallons a day, and when possible should be watered first and fed afterwards. The water which they drink does not remain in the stomach, but passes immediately into the small intestines and in the course of a few minutes passes along the 72 feet of small intestines and reaches the cæcum, or "blind gut," which in a medium sized animal has a capacity of about 4 gallons. The influx of a considerable quantity of fluid into a stomach containing food washes it out of the stomach before it is properly digested, and sweeps it into the intestines, where it may set up irritation or colic. Undigested material is also liable to ferment and give rise to gases. This is a common cause of colic in mules, which, after their morning feed of mealies, are hustled off on their first trek before they have had time to digest them. Arriving at water they drink greedily, with the result that soon after they become "blown up," suffer intense agony and frequently die. Next to horse-sickness, this is probably the principal cause of death of equines in Rhodesia.

It is recognised that horses and mules in this country will not drink till the sun is well up; therefore, to avoid this accident they should receive their heaviest feed at night and only a light meal at least an hour before being inspanned in the morning.

Sheep should have from one to six quarts of water daily, according to feed and weather. It is often stated that sheep require no water, and in countries with heavy dews and where ample succulent food is available water may possibly be denied them, but under the conditions of our country it is a necessity, and should never be withheld. One authority states, "I have noticed that wherever sheep are fed so that they will not drink water, they are fed in nearly the proper manner . . . the nearer we come to it the nearer we are feeding in a perfect way."

Place reproduces the following very striking figures:—"For every pound of dry food, the pig requires 7 lbs. to 8 lbs. of water, the cow 4 lbs. to 6 lbs., and the horse 2 lbs. to 3 lbs., just as a maintenance ration." He adds, "Food and drink, little and often, for the working horse will keep him fit and free from sores and ailments. Succulent food will supply half the cow needs, and nearly all the sheep wants, while the pig will thrive much faster if he has a liberal supply of wash than he would on dry stuff only; and with them all that is the end and aim of their existence, to give the better return in the shortest time for the least cost."

Let us now consider how water can be provided for the use of stock in the dry season.

In the first place, water constitutes a large proportion of the weight of all living plants, especially during the period of active growth, part of it being contained in the tubes and intercellular spaces of the stalk and leaf. This is the "vegetation water," as distinguished from sap or plant juice. Sap is more than water, inasmuch as it holds in solution certain substances, such as sugars and salts. When the plant is dried, these soluble compounds do not pass off, but remain behind as part of the dry matter.

The proportion of water in plants varies according to the stage of growth. Immature plants contain more water than older or mature ones. Young pasture grass is more largely water than the same plants would be after the seed is formed. While our green pasture grasses contain water varying in quantity from 50 to 75 per cent., hay contains only from 7.5 to 10 per cent.

It is true that as far as the chemical analysis is concerned, by adding to a given quantity of hay the amount of water lost in curing, a material is produced containing the same chemical elements, viz., proteids, fats and carbohydrates, in the same proportion as the grass from which the hay was made; but the feeding value of the material also depends upon its palatability, digestibility and assimilability, and in this respect it is found in practice that, at any rate as far as cattle are concerned, the natural water contained in the food is of greater value to the animal than dry food plus a compensating quantity of drinking water. Thus it follows that one of the best ways of conserving moisture for the winter is in the form of succulent feed.

The usual "stand-bys" in this country to supplement the natural grazing in the dry season are hay, mealies, and mealie stalks. More often than not the hay is badly saved, because the rains often prevent the cutting of hay at the best time when it contains the highest food content; that is, before the grass has reached maturity or the nutrient matters in the stem have passed into the seed with loss of protein. In the growing plant the carbohydrates become less, owing to the conversion into cellulose, so that the older the plant the more cellulose and the less starch and sugar substances it contains. Local hay is frequently cut when the grasses have lost their grain, flavour and aroma, and have become woody and indigestible. The best saved hay seldom contains as much as 15 per cent. of water, and much of that is lost during storage. On the other hand, hay saved too moist is liable to fermentation and heating. From this it will be seen that veld hay, even when well saved, will supply but a limited portion of the water necessary in the winter diet.

Nor does maize supply the deficiencies of the winter grazing, as it contains only some 12 per cent. moisture and 10 per cent. proteids, the greater part of the balance being made up of carbohydrates. Great importance is attached by some farmers to mealie stalks as a winter feed to "tide over" the drought, but from the analysis it appears that corn stover only contains 37 per cent. digestive nutrient, as against 63 per cent. in the grain, although relatively high in water content, sometimes yielding as much as 40 per cent. The virtue of the practice lies in that fact.

One way of conserving the natural plant succulence of the summer for use in the winter is by the making of ensilage.

In a very comprehensive article appearing in the February issue of this *Journal,* Mr. J. A. T. Walters, B.A., Assistant Agriculturist and Botanist, shewed how almost all forage plants could be used in the production of ensilage, and among others enumerated maize—"undoubtedly the forage plant *par excellence* for the making of ensilage"—kaffir corn, manna or millet, veld hay, Napier's fodder, teosinte, pearl millet, paspalum or any other hay, velvet beans, lucerne, cowpeas, kaffir beans, Egyptian clover, beggar weed, field peas, ground nut tops, dahl, sunflower heads, and others. An ideal ensilage contains about 75 per cent. of water.

The majority of the crops enumerated in this list need to be cultivated, and this brings us to the necessity and importance of cultivation as a means of conserving moisture, to be made use of in the form of winter crops. Most of the cultivation carried on in this country is for the raising of summer crops, but there are a few plants which continue to make use during the winter of the water conserved by cultivation during the summer. Of these, two of the most useful are sugar cane and the Zinya munga (or Napier's fodder), so frequently referred to in previous issues of this *Journal.*

The following analysis by the Agricultural Chemist shews the value of these plants as a winter feed:—

Particulars of planting, etc.

	Time planted.	Collected.	Sample for analysis. Length of stalk, in feet.	Sample for analysis. Length of leaf, in feet.
Sugar Cane	Jan., 1910	July, 1911	2	4
Zinya Munga	Mar.,1910	July, 1911	8	2

The fodder had not been cut down since planting.

Analysis.

	Sugar cane fodder.	Napier's fodder.
Water	73.63 per cent.	61.81 per cent.
Ether Extract (fat)	0.22 ,,	0.29 ,,
Protein (Nitrogen x 6.25)	1.27 ,,	2.92 ,,
Carbohydrates ...	17.73 ,,	17.29 ,,
Woody Fibre	5.32 ,,	14.77 ,,
Ash	1.83 ,,	2.92 ,,

Root crops, pumpkins and melons belong to the same class. Of these, majorda melon has proved of great value. The following is a report by the Agricultural Chemist on a sample:—

Water	94.63 per cent.
Fat	0.03 ,,
Albuminoids	0.44 ,,
Carbohydrates	4.12 ,,
Fibre	0.43 ,,
Ash	0.36 ,,

This sample was obtained from a small plot at the Gwebi Experimental Farm. "The melons were planted in hills 12 by 12 feet apart. The hills were lightly dressed with kraal manure. The yield per acre was at the rate of 24 tons. These cattle melons kept excellently, were well liked by the stock, and were not fed until August and September."

Pumpkins, turnips and mangolds yielding about 90 per cent., and sweet potatoes about 70 per cent. of water, are also useful.

Rape and kale are now being grown in some districts with success. They contain up to 85 per cent. water, but being harvested up to July, are finished before the critical months of drought.

A man who has invested a large sum of money in a number of cattle, or in stock of improved breeding, cannot afford to see these animals "standing still," or actually losing weight and development for five months in the year. It is as necessary for him to supply winter feed for his stock, as it is for a railway company, if it wishes to pay a dividend, to supply fuel for its engines. Thus, it may become necessary for him to grow crops such as green oat forage, barley, lucerne, etc., under some system of irrigation, whether by a gravitation or pumping scheme. There is no business in which the old saying "time is money" is more true than in stock raising. The whole object of the breeder is to grow as much good meat as possible in the shortest time. In one of the latest meat market reports for England we find, "the day of big coarse joints has long since come to an end, and at the present time the public demand is for smaller joints *with meat of high quality.*" This is a very different thing to the meat obtained from our local undersized, underfed animals of doubtful age. The same article states, "*by withholding a sufficient allowance of proper foods, animals take twice as long as they should to do their work, and the meat is not of such good quality. To make winter feeding a financial success, it is essential to get quick returns from the stock fed, so as to secure a big turnover.*" And since in Rhodesia for six months in the year nature supplies a good and sufficient diet for his stock, it should pay the breeder to provide during the winter sufficient succulent food to maintain the growth made in the summer.

In addition to that available from succulent food, a certain quantity of drinking water is essential. This should be as pure and plentiful as possible, and easily procurable when desired. Many of our farms have a river frontage with running water available throughout the year; but it frequently happens that the approaches to the river are few, and the watering places limited. Here collections of water become shut off and fouled by the excreta of animals. This state of affairs is far worse when, during the winter, the river dries up, leaving behind a few muddy water pools.

The same objections apply to dams and collections of water in low-lying places; these in the dry season become veritable death traps. It is a matter of practical experience that cattle on farms with a supply of clean water and a shortage of food do better than cattle on farms where the grazing is better but the water is polluted. Where foul water only is available it should be filtered. Mr. D'Arcy Cathcart, A.R.I.B.A., kindly supplies the following particulars of a very simple and inexpensive filter which could be constructed slightly below the level of such supplies, the filtered water being drawn off by a small pump to suitable troughs:—"Build filter with brick in cement on footings, and cement concrete, with a centre division having a perforation kept 2 inches above the bottom of the filter. Render the whole of the inside in cement and sand ¾ inch thick, in equal proportions, and finish in neat Portland cement ¼ inch thick. Connect the supply pipe into one end of filter with a 4 inch stoneware pipe, and take a similar stoneware outgo pipe at opposite end, but at a lower level, and connect to storage well (or storage cistern). Fill up the intake chamber of filter to within 3 inches of under side of inlet with coarse gravel to pass a ¾ inch ring; and the other chamber half way up with gravel to pass a ½ inch ring; the remainder, to within 3 inches of the under side of outgo pipe, being filled in with gravel and sand to pass a ⅓ inch ring. The filter should be cleaned out at least every three months, and fresh clean filtering material put in. The chambers should be about 2 feet square by 18 inches to 24 inches deep. A draw-off cock to the filter may be found useful for emptying." A similar filter could be constructed in iron, and would then be portable.

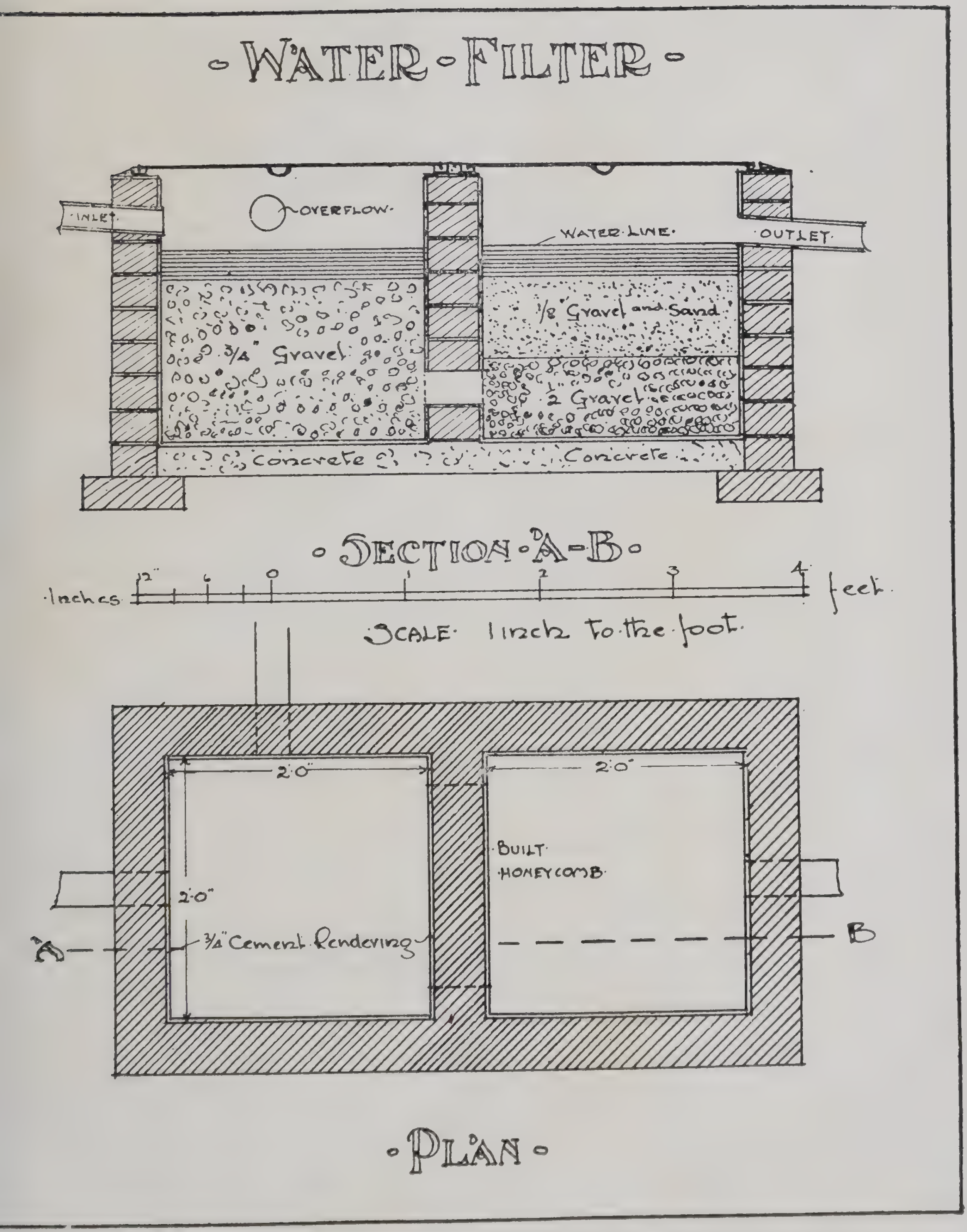
It is highly desirable that animals should take their water from troughs, rather than from the ground level, where it becomes churned up and polluted. A suitable trough can be built in concrete (1 in 8 cement) 40 feet long by 3 feet wide and 2 feet deep, for about £10, exclusive of labour.

Messrs. Mitchell & Liddle of Salisbury provide the following standard sizes of deep cattle troughs framed on angle iron, fitted with angle iron legs and brass plug and chain:—6 feet long by 2 feet wide by 9 inches deep, price £2 10s.; 12 feet long, other dimensions as above, £5; 18 feet long, £7 10s.;

40 feet long by 3 feet wide by 2 feet deep, made out of 20 gauge flat galvanised iron and extra heavy angle iron, £22 10s.

One of the principal means of obtaining a pure water supply in this country is by means of a borehole and windmill. A favourite English-made mill frequently seen in Rhodesia is the "Climax," concerning which the local agents, Messrs. Stewarts & Lloyds, kindly supply the following particulars:—"Cost of 14 feet mill with 40 feet tower and handrail (which is most necessary where inexperienced people have to attend to oiling) complete, erected and handed over in good-going order with 12 months' guarantee, about £105, varying slightly according to the distance from Salisbury. For deep boreholes, the windmill is used with a deep well cylinder. If water is to be raised to a height above top of borehole, a lift and force pump, costing about £5, is necessary. Such a mill is capable of pumping at least 8,000 gallons per diem. It is always advisable to have erection done by an experienced mechanic. It is advisable in certain districts which have low wind velocities to allow for a week's supply. Cost of 3,000 gallon storage tank, £20. The motive power being wind, the cost of running a windmill plant is practically nothing beyond a few shillings worth of oil per annum."

Where there is a stream of running water available (no matter how small a stream) a hydraulic ram may be installed. This is a machine which utilises the momentum of a stream of water falling a small height to raise a portion of that water to a greater height. The conditions being satisfactory, such a plant can be made to force water to 1,000 feet of vertical height. The cost of a ram depends on four conditions:—The height to which it is required to force, the working fall, the quantity of driving water, and the amount to be raised. As an instance, a "Blake's patent" ram, capable of working with a 7 feet fall and pumping 2,000 gallons of water a day against a 30 feet head, would cost about £20. The cost of piping would be extra, and would naturally depend on the length required. A ram needs no fuel, no lubrication; the labour charges and cost of upkeep are negligible. Therefore, where the necessary conditions are available, as they are in



[From drawings supplied by Mr. W. D'Arcy Cathcart, A.R.I.B.A.]

many districts, such as Rusape, this should prove a most economical method of pumping.

It is easy to imagine that many stockowners will look askance at a proposition involving such an outlay, which, however, is but a capital investment, yielding a good rate of interest in the increased growth and earlier maturity of stock, to say nothing of the reduced mortality. Or, to put it in another way, the gain to a herd of 200 head of cattle should in one year balance the cost of a plant capable of providing them with an adequate supply of water all the year round.

Taking the cost of such a plant at £250, which considerably exceeds the estimates quoted, we can set against it:—

Additional growth of 200 head of cattle all round—say 100 lbs. per head live weight, or 60 lbs. dead weight, at 35s. per 100 lbs.	£210	0	0
Reduction in mortality by, say, 50 per cent., or 5 head at £8	40	0	0
	£250	0	0

These figures are an under-estimate, and do not take into consideration the improved condition and reduced death rate of other classes of stock, notably sheep, which are the heaviest sufferers from an impure water supply.

It may be urged that even under existing conditions stock shew a good profit, and that there is no necessity for this expenditure; that the methods of our ancestors, being good enough for them, should serve us equally well. And it is true that, in spite of the set-backs the pastoral industry has experienced from disease and droughts during the past twenty years, it is remarkable how profitable the raising of cattle has proved. But it is gradually becoming more difficult to graze on the old principle; the taking up and fencing of farms seriously limits the movement of herds, and concentrates them upon certain pastures, and at certain drinking places, which thus become stale more quickly than on the old system. Further, the supply of meat is becoming greater than the demands of the local market, and an outlet will have to be found for the surplus. While for a time this may be dealt with by canning, eventually the export of chilled or frozen meat will have to be undertaken, and, if our products are to find favour on the open market, they will have to be of a considerably improved quality.

There is a growing shortage of meat on the world's markets, and an increasing demand; hence the price is steadily increasing, and the profits for the grower improving. It should pay the Rhodesian breeder to commence "right now" to produce stock suitable for these markets.

In a recent "Review of the Frozen Meat Trade, 1914," published by Messrs. Weddel & Co., Ltd., it is stated. "The total receipts of all kinds of frozen and chilled meats in 1914 amounted to 694,465 tons, as against 720,661 tons in 1913. The import valuations of these quantities, according to Board of Trade returns, were £29,960,642 for 1914 and £26,662,896 for 1913. In other words, quantities decreased by only 3.6 per cent., while values increased by 12.4 per cent. . . . Nevertheless the natural growth of the population—apart from any increase in the consumption per head—gives prominence to the fact that importations must be continuously augmented if scarcity is to be avoided. Any marked variations in the volume of importations are, therefore, determining factors in the movements of values generally.

"Taking 100 as indicating the average of top quotations recorded for twelve leading descriptions of frozen meat for the past ten years, the index figure for 1914 was 132.94, as compared with 112.07 for 1913, 104.60 for 1912, 93.35 for 1911, and 96.56 for 1910.

"The prospects of supplies from fresh sources, although brighter than they were a year ago, are still somewhat nebulous, if only because in most cases the quality of the animals now available is such that considerable improvement in breeding is necessary before exportation could be arranged on any large scale."

These remarks apply equally to the breeding of sheep, for which, as the result of the continuous grazing down by cattle, our veld is becoming suitable. But at the present time the local sheep are quite insufficient for our own consumption, and, as we have said before, over £50,000 worth of mutton is imported annually. The shortage is principally due to the heavy mortality caused by verminous diseases, and these are chiefly contracted by drinking infected water or eating infected herbage. If these could be overcome, there is every reason to believe that Rhodesia might in time rival many of the great sheep-producing countries of the world.

The importance of the conservation of water to the sheep industry is well illustrated by the experience of Australia. The total number of sheep in Australia at the present day is about 85,049,000. In an official pamphlet on the subject, the following occurs:—" Although the question of rainfall is the one upon which the stability of the wool industry so largely rests, it is nevertheless a fact that in Australia there are few districts which are too hot or too dry for Merino sheep. The Australian sheepmaster has not only added more than 100 per cent. to the average weight of fleece, but he has evolved a type of sheep constitutionally adapted to get a living when the sheep of most other countries would perish.

" Most of the rivers which traverse the sheep districts of Australia carry intermittently large volumes of water. In former years no effective attempts were made to conserve the flood waters, which hurriedly passed into the sea, or spread over shallow billabongs or swamps, from which they were rapidly evaporated. Nowadays the tendency is to devise effective means of conserving for the use of stock as much water as practicable.

" In many districts where, prior to the discovery of the existence of artesian water, millions of sheep perished through lack of water in the midst of abundance of food, there are now ample supplies flowing from artesian bores. The discovery of artesian water has, in fact, completely changed the outlook over thousands of square miles of country where surface water was the only want, and has opened the way for the pastoral occupation of areas as yet barely touched. It has also enabled sheep to be travelled, when formerly such a thing was difficult or impossible.

" The two most prominent artesian basins are the Great

Australian Basin, about 596,000 square miles in area, extending over parts of Queensland, New South Wales, and South Australia, and the Western Australian Basin, which is probably not much less in area.

"Large numbers of bores, ranging from 250 feet to 4,6 feet in depth, and averaging about 1,500 feet, have been sunk by the Governments of respective States, as well as by pastoralists. From some of these a perennial flow of over 2,000,000 gallons a day is obtained, and the water is conveyed in crude channels, so as to conveniently water stock over large tracts of country.

"In the more closely settled districts, where the combination of sheep-rearing and wheat-growing is annually gaining ground, it is not a difficult matter for ample stand-by fodder to be inexpensively conserved for the comparatively small flocks of sheep that are kept. In the purely pastoral districts every year increased attention is being paid to the production of stand-by fodder.

"It has been demonstrated that from a relatively small area of irrigated lucerne sufficient fodder can be obtained to tide a large flock over a prolonged spell. In the light of this experience, pastoralists in many districts, where formerly it was the custom to depend entirely upon Providence, have adopted this means of providing for seasons of scarcity of natural fodder."

It is true that the industry in Australia largely depends upon water from artesian bores, and that as far as the greater part of this country is concerned, there appears to be no reasonable possibility of obtaining an artesian water supply. We have, however, an abundance of running rivers and streams and ordinary water supplies in both granite and schist formations. Remembering that the annual export of Australian wool exceeds £30,000,000 in value, while about 10,000,000 lbs. of wool is retained in the Commonwealth for manufacture locally into woollen goods, principally tweeds, underwear, blankets and rugs, and that, in addition, the sheep industry contributes to the extent of well over £2,000,000 worth of frozen lamb and mutton per annum, we should realise the desirability of placing the sheep industry in this country on a sound foundation. To do this, we must commence with a pure water supply.

To summarise:—

A good and plentiful supply of water is one of the prime necessities for the preservation of health and condition in animals under domestication.

Nearly half the body weight of these animals is water.

The object of stockmen is to grow the largest quantity of good meat in the shortest possible time. To do this, a supply of succulent food and water is necessary.

Any check in development is harmful and equivalent to a loss of money.

The majority of animals in Rhodesia suffer such a check during the "dry season," owing to the shortage of succulent food and water.

Frequently the only water available is highly polluted, and contains disease-producing parasites.

Unthrifty animals drinking such water are particularly susceptible to disease, and the mortality among them is therefore high.

The financial losses from such deaths, to say nothing of the reduced market value of all classes of live stock, justify some capital expenditure on the provision of a good and adequate water supply, if not an irrigation scheme for the production of winter crops.

In view of the growing demand and the improved prices for meat on the world's markets, such an investment should be amply repaid.

Sudan Grass.

By J. A. T. WALTERS, B.A., Assistant Agriculturist and Botanist.

Among the recent plant introductions by the Division of Botany, none surpasses in interest the grass known as Sudan Grass (*Andropogon sp.*), which was first experimented with at Salisbury about 18 months ago, and a photograph of which, at the period of full maturity, appears on the front cover of the present issue of the *Journal*. So far as is at present known, its value, in addition to being a summer hay crop, lies in the fact that it makes quicker growth as a winter fodder under irrigation than either oats, barley or wheat. It was observed that after a cutting had been taken in June, 1914, the plant attained its full height of about 6 feet in eight weeks' time. Successive cuttings have been continuously taken ever since with a view to obtaining seeds for propagation, and a fair stand of this grass can now be seen at the Botanical Experiment Station, Salisbury. Seed will not be available for distribution, however, for another season.

The extracts given below are taken from an article on Sudan Grass written by Mr. B. Youngblood, Director of the Texas Experiment Station, and which appeared in "Hoard's Dairyman." His statements are so striking that if this grass continues to give results equal to those already obtained, it is destined to become one of the most valuable assets to the dairy and stock farmer of Rhodesia. Mr. Youngblood's remarks on the danger of its crossing with sorghums must be carefully noted, as sorghum (or kaffir corn) is a crop which is largely grown by farmers and natives in this country.

"If, at the present time, there is a farmer in Texas who is not a booster for Sudan grass, it is simply because he has not seen the crop grown, or has been unable to secure seed.

"Judging from the enormous number of requests for information coming from every State in the Union, and even our insular possessions, it would seem that the interest is not confined to Texas alone. The writer has had a great many letters from leading citizens of various States, asking why Sudan grass was attracting so much attention. In each instance he has replied that it is because Sudan grass, from the start, has made a wonderful performance record wherever tried. It gives a highly profitable yield of palatable, nutritious hay.

"It is adapted to practically every soil type and climatic condition to be found in the United States south of the northern tier of States, except, of course, water-logged lands and desert. It is especially appreciated in the south, because it is an annual grass crop, which may be rotated with corn, cotton, and other crops in a manner such as clover. It is appreciated in the western part of the United States because of its wonderful drought-resistance and consequently heavy-yielding powers, under semi-arid conditions. It is appreciated in many parts of the north on types of soil and under conditions where timothy and clover are not suitable crops. It also is destined to be grown in timothy-growing sections, for the reason that it is a more prolific yielder and furnishes hay at a different season. In the western United States, under irrigation, it has out-yielded alfalfa.

"While Sudan grass is especially attractive because of its drought-resistance, it is all the more productive under humid conditions, the principal difference being that in humid sections the seed-yield is uncertain because of an insect known as the sorghum midge which stings the embryo and destroys the seed. The great seed-producing area of the country will be the semi-arid Central West and South-West.

"In Texas the yield of seed has varied from 200 lbs. to as high as 1,250 lbs. to the acre the first cutting. A number of Texas farmers have a second cutting of seed which has not as yet been harvested and thrashed. This goes to shew that it is a prolific yielder of seeds, easily harvested and thrashed. This means that within a few years Sudan grass seed for planting can be had at a much lower figure than any other kind of seed of grass adapted to this country. The first contracts for Sudan grass seed in Texas were made at ten cents a pound, but before deliveries were made the price of seed had risen to two dollars a pound, and, before the planting season of 1914 was over, the price soared still higher, to five dollars a pound. This fall, with possibly 4,000 acres devoted to seed in Texas, and 1,000 or 2,000 acres in the rest of the United States, the price of seed has been reduced by the farmer-growers to one dollar a pound retail.

"At this time the price of Sudan grass seed is fully as cheap, if not cheaper, than Sumac sorghum seed as planted for hay purposes. The Texas farmer plants from two to four bushels of sorghum broadcast for hay, and pays from 1.50 dollars upward a bushel for the seed, making the cost three to six dollars per acre. Sudan grass is planted at the rate of one to three pounds of seed to the acre in drills at the present time, and gives an excellent stand because of its wonderful stooling habit, one seed producing from 20 to 200 culms of stems; and we have record of certain instances where nearly 500 culms came from a single seed. It is a crop, therefore, which adjusts itself to the land automatically.

"The best way to get an idea of the nutritive value of Sudan grass would be to compare it with Johnson grass, which, were it not such a pest, is the most desirable hay-grass ever grown in the country. The following is a comparative analysis of the two grasses:—

	Sudan grass. Per cent.	Johnson grass. Per cent.
Moisture	5.81	8.69
Ash	8.15	12.63
Ether extract	1.68	1.68
Protein	9.13	7.44
Crude fibre	26.74	27.40
Nitrogen-free extract	48.48	45.15

"Another point which speaks well for Sudan grass is that the hay is relished by live stock even when grown for seed and the seed is thrashed off. During the past two years we have fed this thrashed hay to work mules, milk cows, and dry cattle and found that they ate it readily. This caused us to have an analysis made of the thrashed hay. This analysis compares with an analysis of Johnson grass hay as follows:—

	Johnson grass hay. Per cent.	Sudan thrashed hay. Per cent.
Protein	7.2	4.60
Fat	2.1	1.43
Crude fibre	28.5	30.97
Nitrogen-free extract	45.9	47.64
Water	10.2	10.15
Ash	6.1	5.21

"One of the highly important features of Sudan grass hay is its palatability. It is very tender, even when allowed to mature for seed, and has a sweetish taste and pleasant odour which cause it to be relished by all kinds of live stock.

"This grass crosses readily with various members of the sorghum family. It is, therefore, necessary that when planted for seed it should be grown on land absolutely free of volunteer sorghums, such as kaffir, milo, feterita, Johnson grass, and so forth, and that no hybrids which may have come from previous years' crosses be allowed to bloom. These hybrids should be rogued out as soon as discernible in the field.

"When we started the propaganda for Sudan grass in Texas we realised the importance of extreme care in the production of seed, and accordingly began by organising the Texas Experiment Association, one of the objects of which is the improvement, increase, and dissemination of crops. The seed available was prorated among members, and each was required to plant it upon land absolutely free of Johnson grass or other sorghums. This crop was produced under the supervision of the Texas Experiment Station, and inspected by experiment station officials. The seed will be sold strictly upon its merits, as determined by the inspectors.

"Texas dairymen are proud of Sudan grass, for they feel that it means more to the dairy business in the south and west than anything that has been done in behalf of the industry in many years. The writer certainly can commend this crop to every dairyman in the United States south of the northern tier of States."

Agricultural Co-operation.

LIMITED *VERSUS* UNLIMITED LIABILITY.

By E. Wilson.

(Concluded.)

Much has been written and said about the risk incurred by a member of an unlimited liability society. I do not intend to advocate one method as against the other. Both systems have their advantages and disadvantages. Speaking generally, where a society exists solely for the sale of its members' produce, it is quite safely run on unlimited liability lines, the only risk run by members being that of bad debts—a risk all businesses have to take. Where a society exists for the purchase of its members' requirements, or the manufacture of its members' produce, it is perhaps better to limit the risks of members. One advantage of an unlimited liability society is that, in addition to marketing its members' produce to the best advantage, it can also finance its members to a considerable extent, until such time as its produce is realised; whereas with limited liability societies their borrowing powers are often limited by the subscribed capital.

I tried, in the previous article, to shew why agricultural co-operation became necessary to farmers in other countries, and something of the way in which it is conducted. It now remains to try and shew why it is necessary in Rhodesia.

There is a wide-spread idea that the organisation of farmers is a thing to be desired. If an organisation is to have the virility to live it must be born of economic necessity. That necessity first occurred in Rhodesia with the mealie growers. They were in the position of being exploited by a handful of middlemen—a thing easy of accomplishment where there are only a few dealers, with no genuine competition between themselves. But the mealie growers tackled the position, with the result that to-day we have two societies in the country, organised, controlled and successfully operated solely by the members themselves. There are other hybrid forms of co-operation now on trial, with what result remains to be seen. I have heard it said, rather grudgingly, that the co-operative societies should confine themselves to supplying only local requirements of produce, leaving the export trade to be done through the ordinary channels. In my opinion co-operation is more essential in the export trade than in the other, for many reasons.

Sooner or later the value of every form of farmers' produce will come down to bedrock, that is, export price—the world's price. That being so, it will require all our skill and ability to make a living at such prices, and will necessitate us not only producing but marketing our produce as cheaply as possible. We shall not be able to sustain middlemen's costs and profits—we must do it ourselves. True, we shall require capital to do these things, but surely, if we have the produce, we can ourselves raise the capital, and it only needs experience and ability to use it successfully.

What the Home market wants is quantity and quality. What hope has the individual—independently or through a middleman—with his few lbs. of tobacco or butter, or his few hundred bags of mealies, or his few hundred carcases of beef, of creating and maintaining a standard or grade, thereby creating a demand for his particular produce, and consequently top prices? The whole of what we may export for years to come will be but as a drop in the ocean, and its full value will not be realised by us unless we co-operate.

I will now offer a few suggestions to farmers as to how we might co-operate more than we are doing to-day. I expect to be criticised, perhaps told it is impossible; but if any suggestions of mine lead to definite results, I shall have served my purpose.

Firstly, we farmers, through our Agricultural Union, should engage a thoroughly capable expert on co-operation for a term of years, one who has had considerable experience in the organisation and working of co-operation in older countries. He should be an officer of the Union, solely under its control. His duties would be to go round the country and help with his advice the formation and working of societies. His salary should come out of Union funds, to which all farmers' associations contribute, and the Government could fairly be asked to contribute a subsidy towards his expenses.

Secondly, for want of a better proposition, I would suggest that the various farmers' associations—or those who agree to—should form themselves into co-operative societies under the existing Ordinance. They should confine their operations to the selling of members' produce, and the purchasing of the necessary requirements for the handling of that produce.

Thirdly, establish one—or possibly two—central agencies. These should be joint stock companies. All societies should become shareholders in the agency, thereby securing representation in defining policy and conducting affairs. The business of the central agency would be (1) to sell all (or part) of the produce of the affiliated associations, and (2) to purchase any requirements of associations. By doing this in bulk, a considerable saving should ensue.

The working expenses of the agency would be borne in *pro rata* shares by the affiliated societies, and each society should be liable only for any debt incurred on its behalf in purchasing for its members. The agency should also appoint agents in every centre for the sale of produce. From such agents they would get information as to supplies and prices, and thus be able to regulate the same. At present we find in the big centres dozens of produce agents without any mutual working system, and whose one aim appears to be to sell at any price, and thus secure their commission—forgetting that the farmer wants to live. The agency should also lease or erect a cold storage plant for the storage of all perishables, such as eggs, butter, fruit, vegetables, etc., etc., for with these at present there is either a feast or a famine, and the farmer scores in neither case. Most of the larger branches of farming are already conducted on co-operative lines, but it is in the many so-called side-lines that we need organisation.

I do not think there is anything I have suggested that should prevent the existing societies joining in such a scheme as I have outlined. The bigger the scheme, the less the cost proportionately of working the same, and the bigger we buy in bulk, the lower the cost of the article.

To secure the best results, we must be unanimous. The ideal to strive for is that obtained by the farmers of Holland, who are proud of the fact that they are not pampered, spoon-fed, or subsidised by the Government, and yet are obtaining the full value of their labour by agricultural co-operation.

Maize and Wheat.

The immense importance which maize has achieved, not only as a food for cattle, but also for human consumption, rests largely upon its cheapness relatively to other foodstuffs. Maize has, however, risen greatly in price during the last ten years. As compared with wheat, the average price per hundredweight was, in 1903, maize 4s. 11¾d., wheat (British) 6s. 3d.; in 1912, maize 6s. 2¼d., wheat 8s. 1d. The total world's crop of maize in 1913-14 was no less than 1,733,102,517 cwt., compared with 2,053,345,727 cwt. of wheat; and there are years in which the world's maize crop is actually bigger than the world's wheat crop. (*Tropical Life.*)

The Season for Felling Timber.

By J. J. Boocock.

The proper season for the felling of any trees which are to be cut up into timber, or used as fence posts, rafters, etc., is during the resting period.

All trees, whether growing in temperate zones or immediately under the equator, have a period of quiescence, during which time the functions are at rest, and it has been proved that, other things being equal, timber cut from trees felled during this period is more durable than that cut from trees during the active period or growing season.

The durability of any timber is a measure of the time during which it remains sound and resists decay, and this is dependent upon inherent qualities in the tree itself, but even non-durable timbers can be made to last longer by cutting them during the resting period. In Rhodesia, the resting period coincides with the dry season.

There are many substances in wood, such as sugar, albumen and tannin, which are easily decomposed, and form the chief nutriment of the fungi which destroy wood.

The superior durability of winter-felled wood is explained by the fact that during winter, *i.e.*, the resting period, the above materials are in a fixed or resting condition, in which they are more resistant to decomposition.

With regard to shrinkage of wood when felled, *i.e.*, cracking and warping, this principally depends upon two things—

(a) the kind of timber,
(b) the water contents at the beginning and end of drying.

With regard to the former, it may be accepted as a general fact that the heavier a wood the more will it shrink when dried. All timbers can be divided into two classes, soft woods and hard woods. By the term "soft woods" is generally understood coniferous woods, and by "hard woods," broad-leaved species.

Generally speaking, the timber of broad-leaved species is heavier than that of coniferous species, and, in addition, it is more complicated in structure, and consequently in the act of drying, splits and warps more than coniferous wood.

With reference to the water contents, wood is hygroscopic, and its degree of wetness varies with the atmospheric humidity, which varies day and night. It also depends upon the weather, for after rain the stem may become gorged with water, and drier after a period of drought.

Schlich says, vol. 5, "This variation continues throughout the year, and is not confined to any season; felling in summer or winter, therefore, alters the degree of wetness of wood and the consequent shrinkage only according to the weather that prevails at the time of felling."

It is obvious, therefore, that fellings should be made in the dry season, and if rain should fall during that season, it would be better to postpone the felling for a time, in order to allow the trees to get rid of superfluous moisture.

Co-operative Transport for Light Produce.

By R. C. SIMMONS, Chief of the Animal Industries Branch.

The careful observer, travelling amongst farmers, cannot but notice the unnecessary multiplication of labour which takes place in many districts in respect of the transport of small produce, parcels, mails, etc., to and from the farms to the railway station or other business centre, which could be obviated by a very simple application of the principles of co-operation.

A short description of a co-operative light transport syndicate which has lately been inaugurated, and which is working satisfactorily, may possibly prove of interest to some readers of the *Journal*, and lead to other similar syndicates being formed.

On the north side of the railway at Marandellas there is a group of farms situated roughly 20 miles from the station. Of these, two are situated on the main road, respectively 18 and 20 miles from the station. The remainder, eight in number, lie around these two and are distant from one or the other from 1½ to 5 miles.

The occupiers of the ten farms formed themselves into a syndicate, and purchased for £30, on the hire-purchase system, a light covered four-wheeled van capable of carrying 1,200 lbs. regularly.

Each member of the syndicate undertook to supply two oxen and gear complete for one month at a time in turn as notified by the secretary, and to subscribe 10s. per month for twelve months towards working costs and the purchase of the van.

Six oxen pull the van. A native driver and leader (at a cost of 35s. per month for the two) are all the paid labour employed. These boys only work four days a week for the syndicate, but an arrangement has been made with the secretary, at whose farm the van stables, to feed them in return for their labour on the remaining days.

The syndicate is managed by the secretary and a committee of three. The system of working is as follows:—The two farms on the road are receiving stations, and their owners are members of the committee. The van starts from the further farm twice a week, travelling to the station one day, and back the next, so as to connect with the principal out-going mail trains. Each member is supplied with an ordinary delivery book (costing 9d. for 100 pages) having a detachable page and a counterfoil. When he sends goods to the receiving station he enters them on the detachable page, with instructions, and sends the book to the receiving station with the parcel. The receiving station retains the detachable page and initials the counterfoil, returning it by bearer to the member. The receiving station then enters the parcel or goods in the driver's book, and files the detachable page. Upon arrival at the railway station, the forwarding agent initials the book, after checking the goods. Thus the syndicate retains the consignor's original instructions, and as the parcel passes from one hand to the other a signature is received for it, rendering the tracing of any error a simple matter. On the inward journey the same method is used. The forwarding is done at the station by contract for the syndicate at one-third less than ordinary rates.

The rules adopted by the syndicate are more or less as follows:—On the journey to the station each member is allowed to send up to 100 lbs., perishables always having precedence. On the inward journey the same rule applies, but should the parcels for nine members only amount to, say, 200 lbs., and the tenth member has goods up to 800 lbs. awaiting despatch, the 800 lbs. may be carried on the van, or, in other words, the full carrying capacity may be utilised. Any member may ride on the van and carry luggage with him, provided the maximum load is not exceeded. Passengers other than members of the syndicate are charged 5s. per journey, and 1d. per lb. for luggage over 30 lbs.

The van leaves the 20 mile point at 8 a.m., and reaches the station at 5.30 p.m., returning in the same time on the following day. These times were maintained for several journeys in wet weather without any appreciable harm to the oxen.

Now, it should be remembered that half the monthly subscription of 10s. goes towards the purchase of the van, and will cease in twelve months; therefore, it should not, strictly speaking, be reckoned as working costs. Perhaps it will be better, however, in order to be on the right side, to reckon the full 10s. It is found that the ten members between them save five post boys per week at a cost of 10s. per week, and they now get their mail twice a week instead of once, as formerly. This is a saving of 1s. a week per member. In practice, it is found that nearly every subscriber in turn uses the van for goods weighing 600 lbs. or 800 lbs. coming from the station. Whenever this happens, reckoning at ordinary transport rates, a saving of 6s. or 8s. is effected. During the last few weeks various members have used the van for such things as two bags of salt, bags of fertiliser, two rolls of fencing wire, a large box of groceries, and so on, all of which things were urgently needed at the time, and under ordinary circumstances would have entailed a span or half a span of oxen, a wagon and two boys being off the farm for two days.

Apart from the actual cash saving, the elimination of the perpetual worry of having one's own boys running to and fro on messages and loafing about on the road is found to be a great advantage. In some instances it would be possible for such transport as is here suggested to carry the mails, and if by so doing a sum of two or three pounds a week can be earned, the actual cost to the members is reduced to a minimum.

Should any reader wish to discuss the matter of light transport with the writer, he will be pleased to communicate with him, and if possible visit his district if it is thought that advice on the spot would be helpful.

Poultry Keeping for the Rhodesian Farmer.

By Frank Sheppard.

The usual custom amongst poultry farmers of indiscriminately breeding from their mixed flock is one of the chief causes of lack of size and vitality and general deterioration of the birds. A dozen or so eggs are taken from the egg bucket and placed under a hen without the slightest thought as to whether the layer of these eggs was a bird whose progeny would either raise or lower the standard of the poultry on the farm. As "like tends to produce like," the few good points in the breeding birds will be reproduced in the chicks; also the many bad ones, and usually in an intensified form. We should all like to think that every bird we possessed was fit to breed from, but this is not the case. Even on the best regulated poultry farms, only a limited number of birds reared are suitable for breeders, and these must undergo a thorough examination before being placed in the breeding pens. If the poultry keepers who breed in a haphazard manner were to see the care taken in the selection of stock birds by a professional poultry keeper whose birds had been bred from well tried parents for generations, he would fully realise that with his own somewhat inferior birds the importance of selecting his breeding birds with the utmost care and common sense was very much greater. The annual selecting and mating up of breeding birds is perhaps the most important part of a poultryman's work, in which his past experience and knowledge of the subject must be used to the utmost extent. It is through lack of these two essentialities that the novice and thoughtless breeder fail to achieve success.

On large poultry farms, where many hundreds of breeding birds are penned, the selection is a long and tedious process. Each individual bird is handled and numbered. If it has previously been used as a breeding bird and is already numbered, its record is referred to; it then goes through a thorough examination for any deformities, defects or disease, and those which fail to reach the high standard of excellence are discarded. As this rigid process of selection can be carried out with a large number of birds, how very much more easily is it possible to those of us with only a few dozens. As the success of the future depends almost entirely on the present breeding stock, it should be chosen and mated up with the utmost care and forethought.

Before the selection is made, the utility breeder must decide what he intends to breed for, whether for egg production, table birds or for a general purpose bird which will give a combination of the two. In the selection of the stock in general, every bird must be handled. Those possessing any deformities, such as roach-back, crooked breastbone, wry tails, crooked toes, in-knees (termed cow-hocked amongst cattle breeders), must not be used as breeders. We find many cases of birds with crooked breastbones which never lay a fertile egg, and I know of one instance when a bird possessing this deformity laid only soft shelled eggs.

Examine thoroughly for lice, which will usually be found just above the vent and also under the wings. Any birds suffering from cloacitis (vent gleet) should be cured before being used as breeders. This disease, which is one of the most loathsome poultry keepers have to contend with, is easily distinguished by the whitish yellow matter and spots round the vent, also by the offensive odour. It is easily cured by washing the vent with a strong solution of permanganate of potash, and treating with carbolised vaseline daily. The disease is often prevalent amongst flocks of birds without the knowledge of their owner, and as it is rapidly carried through the whole flock by the male birds, all cases should be treated immediately. Birds that have at any time suffered from roup should not be bred from. Although for the time being they may appear to be cured, there is every probability of the disease again shewing itself in their progeny. The birds selected should be healthy, hard-working and vigorous, and as far as possible the hens should have started to lay or be just on the point of doing so. Bright eye, red comb and wattles, tight glossy plumage, except, of course, in the loose feathered varieties, and general alert appearance on other points, must be looked for in our breeders. If the toe nails are examined, those of the working bird will be found to be short and blunt through scratching, while those of the lazy, useless bird will be long and sharp.

It is not the earliest laying pullet that makes the best breeder. Those that have matured gradually and developed the internal organs, will prove the most satisfactory. Early hatched pullets which have been laying four or six months, and perhaps forced, should not be now penned up for breeding purposes, but rather those that have come on to lay in January or February.

After selecting the females for the pen, the male bird must then be attended to. The perfect bird has yet to be hatched, but it must be remembered that the male bird is the most important occupant of the pen, and one must be chosen as near perfection as possible. The faults in the male bird will be reproduced in every chick, whereas if one hen possesses a certain fault, that fault will be reproduced in the chicks from that hen only.

A male bird and females possessing the same faults should never be mated; for instance, if in breeding for table birds the male bird is shallow in body, the females should be large and deep bodied, and it must always be remembered when mating up the pens that the male bird gives the colour and the females the size.

Unless we possess more suitable breeding birds than are required for our pens, we are not always able to regulate the age of our stock as we should like. The ideal pen is two-year-old hens mated to a vigorous one-year-old cock bird. If it is necessary to use pullets in the pens, they should not be mated up until they have been laying for at least two months, and then should be mated to a vigorous cock bird, not a young cockerel. Very old hens seldom make satisfactory breeders, but it is an interesting fact that the old breeders of game cocks for fighting purposes produced the best fighters from five-year-old cock birds mated to four-year-old hens.

In selecting breeding hens for egg production, the greatest importance should be attached to the shape. The body should appear V shaped from whichever way it is viewed, either from front to rear, rear to front or from the side. The legs should be of medium length and set widely apart. The back should be long and the breast broad and long, sloping upwards. The abdomen should be wide and deep, and lower than the breast. The bird should be of medium size. Hens which are either very large or small, according to the standard of the breed, seldom make good layers. The pelvic bone test should also be taken into consideration. These are the two bones at each side of and immediately below the tail. If the bones are far enough apart to admit of three fingers being placed between them, the bird is laying at the time or just about to commence. I always like to have noisy birds in my breeding pens—cockerels that are always crowing and hens which are continually "singing" while scratching, and always let you know when an egg is laid. The egg layer should be an early riser, and when turning out before the sun is up to unlock the colony houses, I like to see the breeding birds searching round in the dim light for the remains of the previous night's feed.

It is fatal to breed from young pullets just starting to lay. The chicks will be weak and undersized, and although it is not the large hen that lays the large egg, we must not expect the standard 2 oz. egg from birds hatched from six months old pullets.

Male birds that have appeared to walk away in growth from the remainder of the chicks usually make good breeders; also those which always call up the hens to share any dainty morsel of food they have found. A bird that has been an outcast of the cockerel flock and is frightened to join in the scrimmage round the food trough, or one that has been badly beaten in a fight, will not be found to be a good breeding bird.

If it is the intention of the breeder to rear table birds, the breeders should be large, deep-bodied birds, somewhat shortish on the leg and with straight keels. If a general purpose bird is required, medium size parents should be selected.

Breeding for sex is a subject which has received the attention of many poultry keepers, but no definite conclusion has been arrived at. One theory put forward is that if a cockerel is mated to old hens, cockerels will be in excess, and if a cock bird is mated to pullets, females will predominate. Another theory is that the manner of feeding the stock birds influences the sex of the progeny, but experience has taught us that we can place no reliability on these systems.

If wire netting is not available for the construction of breeding pens, I have found a native plant called "Jelejele," or "Bino," makes excellent fencing, and after two years has not suffered from the attacks of white ants.

Young stock from the Union of South Africa and Australia may now be imported. Some of the Australian breeders rear a few birds in the autumn, but these are usually to supply the spring markets when prices are high.

The question as to the number of hens to be mated to a male bird is one that is often asked amongst poultry keepers. In Rhodesia the chief question should not be how many hens should be put into the pen, but how long will the same cockerel be required to remain in the pen without a rest. We must keep the cockerels up to the mark, and not over-work them in this climate. I have had pens mated up from a male bird and four females up to a male bird and nine females. A great deal depends, of course, on the male bird, but, as a general rule, six hens of a heavy, and seven or eight of a light breed, will be found satisfactory, but I strongly advise the male birds being changed and given a rest once or twice during the season.

We cannot expect strong chicks next November from a pen of birds that is mated up this month. Let one cockerel run with the birds three or four months, then let him have a rest and another put in the pen. The system of mating twelve or fifteen hens and two cockerels is one which is supposed to reduce the number of unfertile eggs to a minimum. Only one cockerel is run with the hens at a time, and is changed every five or six days. I am penning both heavy and light breeds on these lines this season, and am confident it will prove absolutely satisfactory for Rhodesia; if so, I hope to refer to this subject at some future date. The cockerel which is off duty should, of course, be penned up in a small run or cockerel box by himself. As we are all aware, the percentage of eggs from birds running in small flocks is greater than from those running in flocks of a few hundreds. This also applies to breeding pens. I have seen upwards of three thousand breeding birds penned in flocks of one hundred and fifty hens and fifteen cockerels. The egg records from these birds were anything but satisfactory, either as to quantity or quality. In this case neither the birds nor the system were wholly to blame. In addition to these breeding birds, there were a thousand chickens being reared and some fifty sitting hens. The whole of this plant was left to the care of one man and two boys, who were totally unable to carry out all the duties in connection with the work.

If the breeding stock is run on free range, which is very seldom the case, one cockerel can be run with ten or a dozen hens. A small box of lime, also one of charcoal, should be placed in each pen, and it is surprising how much the birds will eat in the course of a few months.

The eggs from stock birds should be collected as often as possible in this hot climate, and not allowed to remain in the nest, to be heated by a succession of hens during the day.

As a general rule the farmer is a breeder of utility poultry purely and simply, and rightly so, as he has little time to devote to the care and preparation of exhibition stock. There are individual cases where some consideration is given to the exhibition type of bird. The type and condition of a few birds exhibited on Rhodesian shows, which have been bred and reared by farmers, shew that although we have many difficulties to face in penning exhibition birds, it is quite possible to exhibit a bird that will be a credit to the breeder, and will be able to hold its own against imported stock. We might take as an example the second prize White Wyandotte cock at Salisbury show in 1914. This bird was bred and reared by a farmer; it was of good colour and shape, but failed in size a little, and had it not been for a slight irregularity on the comb, which appeared to some of the judges as faking, this bird would have occupied the premier position in its class, which was held by a newly imported bird that failed badly in shape. I am pleased to say that on learning the history of this bird from the owner, it was found that the comb had not been faked.

The greatest drawback we have at present in shewing our birds in exhibition form and good colour is that most poultry shows, which are usually run in conjunction with agricultural shows, are held at a most unsuitable time of the year. If we could shew our young stock in December or January, and our adult birds in April, we should be able to exhibit birds of much purer colour and better condition than is the case at present.

It is not possible in this short article to give in detail the points to look for in selecting layers of the different breeds, but only a few general hints which will apply to all breeds of poultry. Nor is it possible to refer to the mysteries of single and double mating, and the points to breed for and to avoid in breeding exhibition birds. The appearance of many of the birds we see exhibited leads us to think that not only are the exhibitors ignorant of the show points of their variety, but also they do not realise that many points are lost by their birds through want of condition. We do not for a moment expect the small breeder of utility poultry to possess a thorough knowledge of the exhibition standard of his particular variety, but surely his own common sense should tell him that it is useless to pen a diseased or dirty bird. However many points his bird may lose through not coming up to the standard in other respects, it is always within the power of the exhibitor to pen a clean and healthy bird, and thus at least make certain of the points for condition, which vary from 5 to 15 for all varieties of poultry, ducks, geese and turkeys, with the exception of Indian Runner ducks, for which 35 points are given for condition and shape.

In the cattle section of our Rhodesian shows we do not find the farmers exhibiting dairy cows badly infested with ticks, or horses suffering from saddle sores; why then do we find the supporters of the poultry section exhibiting unhealthy birds?

Taken as a whole, the Black Minorca hen class were the worst sufferers from want of condition at Salisbury show last year. None of the birds appeared to have had the slightest attention paid to them in this respect, and as one or two possessed good head points and shape, they were well worth a little care and trouble.

In exhibiting eggs, freshness is the chief point the exhibitor should aim at. The standard used in judging eggs in South Africa is that of the English Utility Poultry Club, which allows 40 points for freshness and 15 each for size, texture of shell, uniformity and cleanliness. In many cases the judge has to use his own discretion, and in Rhodesia, where the majority of eggs fail to reach the 2oz. standard, I personally would feel inclined to give 25 for size and 10 each for texture of shell and cleanliness.

To bring a bird into show condition, it should be penned up at least a week before the show, especially light breeds, which often take longer to settle down to the pen than a heavy breed. One often finds that a bird which appeared fit to exhibit while running in the open makes a very poor picture when placed in a pen, but with proper care and management it will come into form before the show. The bird, if it is at all wild in the pen, should be visited as often as possible and stroked and turned round with a small stick. It will soon become accustomed to visitors and being poked by the judge's stick. If it is at all pale faced, or has a pale comb and wattles, it should be fed by hand with small pieces of raw meat. Daily scrubbing of the legs and feet with a nail brush, soap and warm water, will bring out the leg colour. Any dirt under the scales on the shanks and toes should be removed with the eye end of a fairly large needle, but care must be taken not to cause the legs to bleed. Feeding a small amount of linseed and daily grooming with silk will give a gloss to the feathers. Two days before the show a bird should be washed. Three small baths should be used, the first full of warm water for washing the bird, the remaining two a little cooler to bath the bird in and wash all the soap out of the feathers. This is almost as important as the washing. Whilst washing, there should be some cold water handy, in case the bird faints. If the comb and wattles become blue, be prepared for a faint, and should this happen, dash cold water on the head. The bird will soon come round, and you can proceed. There is very little likelihood of a bird fainting twice. The water in the washing tub should be fairly warm. The bird must be thoroughly wet before the soap is applied to the feathers, and the use of the hands alone will be found more satisfactory than a sponge. When you are satisfied that the bird is clean, wring all the soapy water out of the feathers and place it in the second bath, which should not be quite so warm as the first. In this bath as much soap as possible should be got out of the feathers, and a small tin will be found useful to pour the water over the bird's head and back. Unless all the soap is removed from the feathers, they will not web out properly, and the third bath should be used. When you are satisfied that all the soap is out of the feathers, wring the water out as much as possible. If the bird is then taken outside and grasped by the legs and given a few gentle swings, this action and the flapping of the wings will expel some of the remaining water. The bird should then be dried with towels and placed on a perch in a clean drying box, either in front of a fire or in the sun.

If these few hints are carried out by the exhibitor, his bird will have a fair chance of success. The great majority of birds on our shows are not of exhibition type, and when judging utility birds to an exhibition standard, in many instances it is the condition alone that decides the winner.

Notes on Bee-Keeping.

By Frederick Sworder, Hallingbury, Hartley.

The principle of the frame hive is that the respective combs are built in separate frames all hanging securely in the brood chamber, yet each one capable of being easily lifted out at any time for examination.

When reasonable precautions, as previously described, have been taken to subdue the bees, very little disturbance is caused and with no injury to the combs. In order to assist the bees, sheets of pure beeswax embossed to the correct pattern, called comb foundation, are inserted in these frames. For the sake of economy, most bee-keepers purchase hives and also these frames in the flat, or, to use an American term, "knocked down." Various systems of fastening these frames together from the flat and fixing the comb foundation into them have been tried, many having proved very serviceable. Some bee-keepers prefer one particular make of frame, whereas others will discard it, yet each kind has its advantages. The main feature of a frame as a whole is its design, combining proportion of its various parts, so that when nailed together it is light in weight, yet strong.

After much practical experience, I must confess that as a general-purpose frame I prefer the "British Standard," as it embraces the above respective features. In nailing it together from the flat, and fixing in the comb foundation, I have found it to be of the most simple, effectual and substantial design. It possesses a saw slit extending nearly the whole length of the top bar, into which the sheet of comb foundation is inserted. Some bee-keepers maintain that this principle is a source of weakness, thereby causing this top bar (on which is placed the crate of sections with its weight of honey) to sag or bend. If this is considered an objection, my experience goes to prove that it is not so.

In the hands of a novice, where comb foundation is fixed to the top only, there is every probability that it may break down during an examination of a frame, for the completed comb, sometimes weighing quite 4 lbs., is unable to bear this weight if held in a horizontal position. To a novice examining a hive of bees, and who is at that moment summoning his whole courage, what can be more disconcerting to him than to witness the comb with its living freight fall at his feet? Although it takes time to fix the wire into the frames, it is not difficult; besides, it has advantages which compensate the bee-keeper, and it is worth doing every time, for frames can be handled with confidence, which is an assurance that no harm can happen to them.

In nailing together frames of the above-mentioned type, I always use a frame block. This simple article ensures that the frame when completed is absolutely correct, so that where a number of them are hanging in a hive, every part of each frame will be equi-distant and parallel.

From the flat to the completed whole, *i.e.*, with the comb foundation inserted and embedded, the frame has to undergo eight distinct operations, and in executing this work on a reasonably large scale, a practical workman will have accomplished a fair day's work if he can turn out one hundred completed frames.

Before nailing the frames together, bore two holes in the side bars about 3 inches apart, just sufficiently large to allow the wire, No. 30 gauge, to pass through. Now lay a top bar of a "Standard Frame" down on the table or bench, and with a light hammer knock the two side bars into the respective mortices of the top bar. This done, turn the frame over on its side and secure each of the side bars in position with a seven-eighths of an inch fine nail. Then place the frame upside down and nail on the bottom bar.

The frame is now ready for wiring. Fix the top bar of the frame in a vice, with the bottom bar uppermost, commence threading the wire horizontally through the right-hand bottom hole, pull it through to the corresponding hole at the opposite side; then thread the wire through the uppermost holes back to the right-hand side bar. Pull both wires fairly tight, give them three or four twists, and with a pair of scissors cut the wires and carefully tuck the twisted ends into the right-hand uppermost hole. A W.B.C. tin end (previously described) should now be pushed on to each lug of this top bar, which will prevent it from splitting when the foundation is inserted. Then cut off with a hot knife two corners of the sheet of foundation now to be inserted in the saw slit. A simple, yet effective, appliance which will be found helpful in this operation is the foundation fixer. This handy article is supplied by appliance merchants, costing only a few pence. By its use the saw slit is opened ready to receive the sheet of foundation, while there is no possibility of buckling or bending this fragile substance. The frame, with the sheet of comb foundation firmly held by the tension of the split top bar, is now ready for embedding.

Prepare a planed board about $\frac{3}{4}$ of an inch in thickness and in size small enough to fit the frame comfortably. Lay the frame on the board with the wires uppermost: thus supported, the wires can now be pressed into the comb foundation with an embedder wheel (supplied by appliance merchants) which is previously heated on a Primus stove or a spirit lamp. As the heated embedder wheel is firmly run along each wire the wax melts and instantly cools, thus the wire is gripped securely, uniting them both, and the frame is complete. Now hang the finished article in a vertical position, just as it would be in the hive.

Realising that many people wishing to commence bee-keeping in remote districts have few opportunities of witnessing the operation of constructing a frame correctly, I have endeavoured to explain the process in detail, and provided these instructions are carefully followed, the novice should be able to accomplish it satisfactorily.

When correctly embedded, the presence of these wires is no detriment to the bees, for in those cells through which the wires pass (after the cells have been extended by the bees) honey will be stored, while the queen will lay, and young bees will develop equally well. By adopting this system of wiring, and where hives stand perfectly level, we can ensure that the bees will build straight combs, and it is when removing or replacing a frame thus treated that the advantage is manifest.

This system is universally adopted in all countries, and even in Rhodesia, with its warm climate, I have repeatedly transported swarms of bees long distances, both by road and rail, all arriving quite safely, so that I have every confidence in advising bee-keepers to adopt this proved principle.

In some districts bee-keepers prefer to work their hives for extracted honey, and when using the honey extractor it is absolutely essential to have all the frames wired, for the centrifugal force exerted by this serviceable machine is so severe on unwired combs of honey that they are bound to break down during the process of extraction.

World's Food Productions and Requirements.

An investigation into the production, imports, and exports of food products of various countries indicates that England produces about 53 per cent. of her food requirements, and imports (net) about 47 per cent.; Belgium produces 57 per cent., and imports 43 per cent.; Germany produces 88 per cent., and imports 12 per cent.; France produces 92 per cent., and imports 8 per cent.; Austria-Hungary produces 98 per cent., and imports 2 per cent.; Russia produces about 110 per cent. of her requirements, and exports an equivalent of about 10 per cent.; Canada produces 23 per cent. more than she consumes; Argentina produces 48 per cent. more than she consumes; the United States produces practically no more than she consumes (*i.e.*, exports and imports of foodstuffs almost balance).

These estimates are based upon latest available data, mostly for the years 1912 and 1913. The importations represent the net importations; that is, exports are deducted from the gross imports. In making these estimates difficulties arose mostly in determining the production of meat products from available data of live stock; also, in securing satisfactory valuation of the different classes of foodstuffs, as edible grains and meats, which was necessary to establish a weighted average of production for all products. But, notwithstanding these difficulties, the figures given above are probably within a small per cent. of accuracy.

England.—The country most dependent upon importation from foreign countries is the United Kingdom (England, Wales, Scotland, and Ireland). She produces only 27 per cent. of her requirements of edible grains (including flour as wheat), but 53 per cent. of her meats, 62 per cent. of her dairy products, 58 per cent. of her poultry, more than 90 per cent.

of her vegetables, and 21 per cent. of her fruits. Of fish she produces more than she consumes; that is, she is an exporter of fish products.

It will be observed that her dependence upon imports is greatest of grain products. In some discussions of the food requirements of England, as well as of other countries, conclusions are based solely upon the import requirements of wheat alone, and therefore the dependence upon foreign countries is exaggerated. For instance, although the United Kingdom imports nearly 75 per cent. of her needs of edible grains, she imports only about 10 per cent. of her needs of vegetables, the total value of which is nearly equal to that of her edible grains.

GERMANY.—Germany imports about 18 per cent. of her requirements of edible grains (including flour), producing about 82 per cent. of her requirements; she produces about 93 per cent. of her meats, 92 per cent. of her dairy products, 67 per cent. of her poultry, 99 per cent. of her vegetables, 48 per cent. of her fruits; she is a large exporter of sugar, her production being 177 per cent. of her consumption; that is, she exports 77 per cent. as much as she consumes.

FRANCE.—France imports about 7 per cent. of her requirements of edible grains, producing about 93 per cent. of her requirements; she produces 98 per cent. of her meats, 80 per cent. of her poultry, and 91 per cent. of her sugar; she produces slightly more than she consumes of dairy products, vegetables and fruits.

AUSTRIA-HUNGARY.—Austria-Hungary is almost self-sustaining in food supplies; she is a fairly large exporter of sugar, and a large importer of coffee; in most other food products her imports and exports nearly balance, or are a small proportion of the production.

RUSSIA.—Russia is a surplus producer of foodstuffs; she exports 19 per cent. of her production of edible grains; or, in other words, her exports amount to about 24 per cent. as much as she retains for consumption; her exports of dairy products equal about 10 per cent. of her home requirements; her exports of poultry are 19 per cent.; her exports of vegetables are 4 per cent., and her exports of sugar are 33 per cent. of her home requirements.

UNITED STATES.—The United States in recent years has been as large an exporter; therefore she cannot be classed as a surplus producer of foodstuffs. This is contrary to popular impression. It is true that she is an exporter of certain articles, but she is an equally large importer of other articles. In this classification tea and coffee are included with foodstuffs. In edible grains, the production is 23 per cent. more than the amount retained; the production of meats is 6 per cent. more —that is, exports of meats equal 6 per cent. of that retained in the United States for consumption: the production of dairy products is 20 per cent. more than consumed; the production of poultry is just about equal to consumption; of vegetables, 1 per cent. less; of fruits and nuts, 6 per cent. less; only 24 per cent. of the consumptive requirements of sugar are produced at home, and, of course, none of the tea and coffee.

ARGENTINA.—The exportations of edible grains from Argentina equal 149 per cent. of the amount retained in the country, and of meat products 36 per cent. These represent practically all of the food products exported by Argentina. Her production and consumption of dairy and poultry products about balance, but she is a small importer of vegetables, sugar, and fruits and nuts. Her total exports of foodstuffs equal 48 per cent. of the amount retained.

CANADA.—The quantity of edible grains exported equals 129 per cent. of the amount retained in the country, of meat products 8 per cent., of dairy products 12 per cent., and of fish products 94 per cent. She imports 6 per cent. of her food requirements of poultry and eggs, 3 per cent. of her vegetables, and 38 per cent. of her fruits and nuts. Altogether she produces 23 per cent. more than she consumes of foodstuffs.—(*Canadian Countryman.*)

The Agricultural Returns for 1914.

By B. Haslewood, F.S.S., Statistician.

These returns have been completed and the results are now published in tabular form, shewing the total numbers of live stock, as at the end of the year 1914, in each district and in the Territory as a whole, as well as a record of agricultural produce and crops for the year 1914. While the response from the whole farming community has been most encouraging, and augurs well for the future success of these statistics, there were instances in which some dilatoriness was shewn and it became necessary to draw attention to the compulsory clauses of the Ordinance. This was perhaps most noticeable in regard to the district of Melsetter; though it is only fair to add that excuse might be found in the remoteness of many of the farms, and in the disorganisation of the ordinary facilities of communication caused by the rains. It was early realised that too much reliance could not be placed on the crude figures that were frequently given in the individual returns as originally sent in, particularly under the two latter categories—produce and crops; the consequence being that a considerable amount of checking and counter-checking had to be done in order to reconcile the resultant totals one with another. There is, furthermore, abundant evidence in the individual returns themselves that few of our farmers keep any books or permanent records of their farming operations and the results achieved; and, as the Ordinance itself only came into operation late in the year, it followed that memory had to be unduly strained, in very many instances, in the endeavour to furnish the figures and details asked for after a lapse of some months, during which other matters of interest had supervened.

The figures relating to live stock, on the other hand, may be relied upon as approaching something very near accuracy in the mass; at any rate as regards European farmers. In this case, it was possible to fix a definite date, viz., the 27th December, for the simultaneous reckoning of each individual's possessions, and—the bulk of the forms having been sent out in time to reach the addressee just before or about that date—there was generally no need to fall back upon memory for the figures. As regards "Natives," the figures given are those compiled by the Native Commissioners, and may be taken to reflect the position as approximately as is possible in any estimate framed under the peculiar difficulties attaching to such a task where natives are concerned. The following brief table shewing a comparison between the 1914 figures and those of the Census of 1911 may be of interest:—

	Mashonaland.		*Matabeleland.*		*Southern Rhodesia.*	
	1914.	Census of 1911.	1914.	Census of 1911.	1914.	Census of 1911.
Horned Cattle.	455,146	287,410	292,912	176,513	748,058	463,923
Sheep.	150,668	141,839	173,576	150,533	324,244	292,372
Goats.	384,668	360,914	290,122	240,721	674,790	601,635
Horses, Mules and Donkeys.	8,137	9,796	10,756	10,309	18,893	20,105

It will be noticed that there has been an increase, since the 1911 Census, in horned cattle of 284,135, or over 61 per cent.; in sheep of 31,872, or nearly 11 per cent.; and in goats of 73,155, or over 12 per cent.; while horses, mules and donkeys are fewer by 1,212, or just over 5 per cent. Of course, in regard to these last, it must be borne in mind that the 1914 returns do not profess to take into account those which are used for purposes not connected with farming or transport, so that animals in Salisbury, Bulawayo and other townships such as would ordinarily be included in a proper census are excluded from these returns. Still, after full allowance has been made for this factor, there can be little doubt that there has been a marked decrease under this head, a decrease partly due to the extension of the railways, but in greater degree to the encroachment, even amongst the farming community, of the mechanically-propelled vehicle.

It is not proposed to go into any detailed analysis here of

the returns themselves, but there are one or two points that suggest themselves for consideration. First, in regard to cattle, the classification adopted was purposely simple and designed to give the minimum of trouble to those filling in the forms; yet there were instances in which the grouping into four headings presented too much trouble, and one globular number was set down presumably representing the total of cattle of all kinds. Then, in quite a number of forms a return of *nil* was made under "Bulls in use for stud purposes"; the inference being that the farmer had taken this heading to mean "pedigree" bulls only. Under "Poultry," again, a *nil* return was made in more instances than seem compatible with one's recollections of the average farm, even in Rhodesia.

It is to be noted, however, that any such errors in regard to component details do not affect the accuracy of the total; and, as already stated, the actual position as regards live stock in the mass is very closely reflected in the figures given.

As regards farm products, it was apparent in many instances that the return given of eggs, cream, milk and butter was, or aimed at being, the total quantity *produced*, while in others it was equally evident that the effort had been restricted to the precise requirements of the form, viz., the quantity *sold*. The probability is, therefore, that the totals given under these heads represent something more than was actually brought into the market, but less than the district and Territory produced.

As regards butter, it may be something of a shock to many worried housewives in these times of scarcity and high prices to learn that in some districts its only profitable use is to be turned into soap.

The return of last season's (1913-14) crops, too, was a matter that obviously presented considerable difficulty to farmers, mainly owing to the lack of "books," or any sort of permanent record already alluded to; while, in not a few instances, the problem of estimating the area originally sown was evidently regarded as insuperable without the aid, as was suggested in one instance, of a properly qualified and equipped survey party.

Generally speaking, therefore, anything like accuracy in regard to the figures under these heads is hardly to be looked for in these first returns.

It would be superfluous to refer here to the ravages caused by the drought in many districts of Mashonaland and in practically the whole of Matabeleland. Indeed, in the case of the latter, it would be no exaggeration to say that the maize crop was entirely a failure, and in the majority of cases it was only possible to make use of it as ensilage.

There was some misapprehension also in those cases where two or more farms were owned and worked by the same person. The intention was that, where such farms were absolutely contiguous to one another, so forming practically one undertaking, one inclusive return should be made, covering both or all of the farms named on the form. This was almost universally taken to apply to all such cases, whether the farms adjoined one another or not; and when, as in some instances, they are actually situated in different districts, it becomes impossible to say which district should be rightly credited with the return of stock and crops, etc.

These and many other similar little difficulties encountered in this trial-run, if one may so term this initial effort in connection with the Agricultural Statistics Ordinance, are of no serious import, and are only noted in order to shew where effort is required to counteract them. At the very beginning, the Department was faced with considerable difficulty, in that there was no readily available or reliable register of the names, much less of the addresses, of persons occupying the several farms; though this was to a great extent discounted by the very valuable, and indeed indispensable, assistance that was so courteously and freely given by the officials of the Estates Department in the often difficult task of locating and identifying farms and their owners or occupiers. With the best of intentions, however, some omissions and inaccuracies, especially as regards addresses, were unavoidable, and were the cause of some delay and confusion, with attendant annoyance to individuals, which is regretted, but which, it is hoped, will be overlooked. A fairly comprehensive and, it is hoped, accurate register of all farmers and their addresses has now been compiled, and in this direction there should be little difficulty in future; though the kind assistance of the farming community must continue to be looked for in order that the Department may be kept in touch with the changes in regard to farm occupation that are so constantly taking place.

As shewing the gratifying response made by the farming community generally, it may be mentioned that returns were actually received covering 2,042 surveyed farms, as compared with 1,770 that were understood, from such sources of information as were accessible hitherto, to be beneficially occupied.

Reference will not be out of place here to the desire urgently expressed by quite a large number of farmers that the scope of these statistical returns should be extended to include such crops as kaffir corn, monkey nuts and citrus fruits, and the area of irrigated land. It was, of course, in deference to the opinion recorded at the 1914 Congress of the Agricultural Union that the crop returns were restricted for the present to maize and tobacco; but if there is now a feeling amongst a majority of farmers that these might usefully be extended in the direction indicated, there would be no difficulty so far as the Ordinance is concerned.

Returns have recently been called for in regard to the estimated harvest of maize and tobacco this current season, and these are now coming in freely. In this connection it should be pointed out that, owing to the simple and straightforward nature of the information asked for, merely a bare statement of the acreage and probable yield of the two crops—maize and tobacco—it was not considered necessary to send out special forms in the first instance; a view which is amply borne out by the prompt and most gratifying response that has already been made from all parts of the Territory. A number of reprints of the Government Notice, which itself can be used as a form, have been sent to all post offices and postal agencies for exhibition and, if necessary, for distribution to such as require them; and one of these reprints will also be sent as a reminder to all those farmers who, from failure to see the advertisement in one or other of the newspapers, or from inadvertence, or from any other cause, omitted to send in their returns by the due date.

Maize Foods.

[Extracted from Farmers' Bulletin No. 1, issued by the late Transvaal Department of Agriculture.]

OHIO MAIZE BREAD.

INGREDIENTS:

3 Tablespoonfuls butter.
3 Tablespoonfuls sugar.
2 Eggs.
¼ Teaspoonful salt.
1 Cupful sweet milk.
1 Cupful flour.
1 Cupful maize meal.
3 Teaspoonfuls (level) baking powder.

Rub to a cream butter and sugar, add eggs, and beat until mixture is light. Then add salt and milk and mix well together. Sift together flour, maize meal and baking powder, and add to the mixture in small quantities, whipping until quite light. Bake 25 minutes (hot oven) in a round baking-pan.

DELICATE PUDDING.

INGREDIENTS:

1 Quart of milk.
2 Heaping tablespoonfuls maize meal.
4 Heaping tablespoonfuls sugar.
1 Heaping tablespoonful butter.
3 Eggs.
1 Teaspoonful salt.
½ Teaspoonful ground ginger.

Boil the milk and stir the maize meal into it; cook 15 minutes, stirring often, that the milk does not scorch. Beat together the eggs, salt, sugar and ginger; stir the butter into the milk and meal, and, when well mixed, pour this gradually on the egg mixture. Pour into the pudding dish and bake 1 hour. Serve with cream and sugar.

MAIZE CAKE.

INGREDIENTS:

3 Cupfuls maize meal.
1 Teaspoonful salt.
1 Tablespoonful sugar.
1 Tablespoonful butter.
1 Egg.

Take maize meal, salt, sugar and butter, and wet this with boiling water; then beat in egg; spread half an inch deep on buttered shallow pans, and bake brown in a quick oven. This is delicious.

SUCCOTASH.

INGREDIENTS:

10 Ears of maize.
1 Cupful milk.
1 Tablespoonful butter.
Lima beans, or any beans, green or dry.
Salt.
Pepper.
Soda.

Cut the maize from the cobs, mix this with one-third the quantity of beans, and cook for one hour in just enough water to cover them. Drain off most of the water; add milk, with a pinch of soda stirred in. When this boils stir in butter rubbed in flour; season with pepper and salt, and simmer for 10 minutes longer.

DRIED MAIZE.

(For winter use.)

Husk the maize, put into kettle of boiling water, and cook for 3 to 5 minutes, to set the milk in the kernels. Then cut from the cob, and, with the back of the knife, scrape the cob to get all the milk, and spread in shallow pans. Dry in slow oven or in the sun. When perfectly dry, put into paper bags. Before using soak the maize over-night.

Maize dried in this way retains more of its sweetness, is much easier to prepare, and takes less space in the pantry than if canned and bottled.

MAIZE BREAD.

The following is the winning recipe at the maize bread competition held at Johannesburg recently:—

Quantities.—5½ breakfast cups of mealie meal, boiled; 2½ dry; 2 breakfast cups of wheaten flour; 2 breakfast cups of home-made yeast; 5 breakfast cups of water; 1 dessertspoonful of salt.

Method.—Place the water in pot to boil, and salt when boiling, and gradually sift in mealie meal; boil 10 to 15 minutes slowly. Allow to cool off to lukewarm, then add yeast. The boiled meal and yeast must be thoroughly mixed—almost like creaming for a cake; when perfectly smooth, add one cup each of flour and mealie meal, mix thoroughly, and set to rise from five to six hours. Add remainder of dry flour and meal to make the loaves into shape, place in bread pans, and allow to aerate for about 15 minutes. Bake in a smart oven 1½ hours; when cooked rub top crust over with a little butter—this gives it a nice appearance.

Quantities sufficient for two loaves as sample.

THE BEST RECIPE.

In awarding the prize for the best recipe, the judges decided on the following as being admirably clear, careful, and likely to give the best results in the hands of the experienced bread-maker:—

Quantities.—4 cups mealie meal; 2 cups flour; one-third yeast-cake; 1 tablespoonful sugar; 1 dessertspoonful salt; lukewarm water in which potatoes have been boiled.

Method.—Over-night put a cup of boiling water in a saucepan on the fire; put in salt, then put in three cups of mealie meal, and let it boil for an hour, without stirring, on a very slow fire. Now take off and stir till it is fine like meal. Let it cool, then add 1 cup of mealie meal, which has previously been soaked for 12 hours, flour and sugar, and the yeast-cake, which has been dissolved in a little lukewarm water. Add a little lukewarm water (in which potatoes have been boiled), and knead into a stiff dough. Set in a warm place to rise. In the morning knead again and mould into loaves. Leave to rise again, then bake in a fairly hot oven, and you have an excellent loaf of nutritious bread.

Soaking mealie meal always improves the bread.

M'fufu and Napier's Fodder over 12 feet high, growing at Mr. P. C. Rutherfurd's farm, Whareiti, Umtali. M'fufu planted 6th December, 1914; Napier's Fodder, on left, planted July, 1914.

M'fufu Grass at Mr. P. C. Rutherfurd's farm, Whareiti, Umtali. Planted 6th January, 1915, in dry land, and now 12 feet high. In the foreground can be seen the re-growth (7th March, 1915) after cutting on 15th February, 1915. This grass has grown quicker than mealies.

Correspondence.

M'FUFU GRASS.

To the Editor,
Rhodesia Agricultural Journal.

Sir,

I am sending you a few photographs shewing the growth of m'fufu grass planted by me on dry land during last December and January, 1915. I have been feeding my horses, cattle and pigs on this grass continually during the end of February and this month.

Although cut down early last month, there is abundance of fresh feed already grown three feet high. The Napier fodder planted last July has also grown well, and can be distinguished by its broader leaf and coarser cane. If the farmers of Rhodesia had the experience I have had with this most useful winter feed, I am of opinion there would not be a stockowner in this country without an acre or two handy to his homestead. I have collected some seed and intend sending it to Mr. Mundy, in hopes that he may be able to get it to grow.

Yours, etc.,

P. C. Rutherfurd.

Whareiti, Umtali,
11th March, 1915.

Review.

Agriculture; Theoretical and Practical. By John Wrightson, M.R.A.C., F.C.S., and J. C. Newsham, F.L.S. (Crosby Lockwood & Son, 7, Stationers' Hall Court, London, E.C.).

This is a text book of mixed farming for large and small farmers and for agricultural students. The book is divided into six parts, and the subjects dealt with are:—(1) Soils, Manures and Crops; (2) Live Stock, Feeding and Economic Zoology; (3) Buildings, Machinery, Implements and Accounts; (4) Dairying; (5) Horticulture; (6) Poultry, Rabbits and Bees. The book thus covers nearly every branch of agricultural practice. The authors have exceptional qualifications for the task, Professor Wrightson, who for many years was associated with Downton Agricultural College, being recognised as a sound and practical farmer, while Mr. J. C. Newsham most successfully filled the post of head master of the Hampshire Farm School and county lecturer on agriculture for a considerable time. The information contained in the book is set forth in simple language, and can easily be followed by the ordinary farmer.

While the book is without doubt a valuable addition to agricultural literature, and will be of great assistance to the Home farmer, there is much information that is not applicable to this country, where the conditions in so many respects are so vastly different. The value of the book lies in the fact that it gives an expression of the modern ideas of farming, embodying the results of the latest experiments, while it presents in a concise manner the science of agriculture as dealt with in various manuals and text books.

The Agricultural Outlook.

From what can be gathered, the maize harvest is likely to be a record one, and arrangements are being made for the exportation of a big surplus. We forbear giving an estimate of what the crop will be, but particulars are now being collected by the Statistical Bureau, and will probably be made public when complete. The season has been quite an exceptional one. Parts of Matabeleland, after suffering most severely from a succession of years of drought, this year were flooded out, crops in many places being total failures. In some districts, however, good returns are expected. Generally speaking, the crops planted on the sandy and red soils will give bumper harvests, but those sown on the heavier lands have in many instances failed. The tendency in the recent unusual years of drought has been to move more and more to the low lying lands, with the result that in the present season of excessive rain, the crops have been water-logged. This is particularly the case in the Midlands, where in many cases, we regret to say, practically no return at all can be expected. Mashonaland generally has not had so much rain as Matabeleland, and the precipitation has been better distributed. Caterpillars in some instances caused considerable damage to the young maize plants, but big yields are looked for from most districts. The tobacco crop in all probability will be a small one. The season has not been propitious, while the acreage planted to tobacco was much smaller than it has been in the last few years, Considerable areas are being prepared for winter crops, which should do well, the vlei lands being likey to remain moist throughout the winter season.

Horse-sickness is rife everywhere, and the total number of deaths will probably constitute a record. Stiff sickness in cattle has been very prevalent, but very little mortality has occurred. Small stock suffered severely from the heavy rains, but at the present time the condition of both large and small stock is excellent. There should be a sufficiency of water and grazing in most districts during the winter months, but farmers would be wise not to depend exclusively upon these sources of supply. The necessity of providing an adequate water supply for stock is capably dealt with by Mr. Bevan in this issue, and we would advise all stockowners to read his article carefully. Regarding the winter feeding of stock, we would once again emphasise the importance of preparing supplementary foods in the form of ensilage and other material.

It is the common practice now to burn fire guards for the prevention of grass fires, and no mention need be made of the subject except to remind farmers that the sooner this is done the less likely are they to be burnt out.

Wanted.

The following numbers and indices of the *Rhodesia Agricultural Journal* are out of print, and have been enquired for by a reader, who is willing to pay 5s. each for them:—

Vol. I.—Nos. 5 and 6, plus index.
Vol. II.—No. 2.
Vol. V.—Index.

In addition to the above, the following have been enquired for:—

Vol. I.—Nos. 2 and 6.
Vol. II.—Nos. 1 to 3.
Vol. III.—Nos. 1 and 6.
Vol. IV.—Nos. 1 and 4.
Vol. V.—Nos. 2 and 6.
Vol. VI.—No. 2.
Indices to Vols. I., II., III. and V.

If any readers have any of these *Journals* and indices in their possession, and do not require them, we shall be very pleased if they will kindly send same to the Editor. If it is desired, they can be exchanged with any they may have missing, if available.

Exchange and Mart.

R. Taylor, Suffolk farm, Marandellas, has a Premier No. 3 power mealie mill, made by Hunt & Co.; runs at 450 to 500 revolutions per minute. Wishes to exchange for mower (must be in good running order), or for any other useful farming implement of equivalent value.

Veterinary Report.

January, 1915.

AFRICAN COAST FEVER.

Salisbury District.—Two fresh outbreaks occurred—(1) farm Mabelreign, (2) farm Sigaro: one death at each farm. Fortunately dipping has been fairly regularly practised at both farms, and it is not anticipated that heavy losses will occur. At the other centres of infection—Epworth and Bluff Hill farms—61 and 12 head respectively were destroyed.

Bulawayo District.—The last case of coast fever in the district occurred in May, 1913, and it is now regarded as free from infection.

Umtali District.—No cases occurred at any of the infected centres.

Melsetter District.—Two fresh outbreaks occurred—(1) on the farm Clearwater, involving 210 head of cattle; three-day dipping was immediately instituted; within a fortnight 24 deaths occurred, shewing that gross infection exists; (2) on the farm Springfield, involving 209 head; 2 deaths occurred. On the already infected farm Nooitgedacht one death occurred.

EPHEMERAL FEVER (THREE DAY SICKNESS).

This disease prevailed throughout the Territory, but the mortality recorded was practically nil, except in cases where treatment was attempted.

HORSE-SICKNESS.

The mortality throughout the Territory was very heavy; in fact, one of the heaviest on record for the month of January.

ANAPLASMOSIS (GALLSICKNESS).

Heavy mortality in calves from this disease, complicated in many cases with redwater and diarrhoea, is reported from several districts. Considerable mortality occurred also amongst imported animals. The District Veterinary Surgeon, Bulawayo, states that the redwater infection appears to be of an unusually virulent type.

GLANDERS.

The following animals were tested with mallein on importation, with negative results:—Horses, 6; mules, 10; donkeys, 31.

TUBERCULOSIS.

The following imported animals were tested with tuberculin:—Heifers, 4; bulls, 1. Two doubtful re-actions occurred, and the animals were put back for a further test.

SARCOSPORIDIOSIS.

A smear from a two-year-old heifer on Umtali Commonage shewed the presence of this parasite.

IMPORTATIONS.

From the South:—Horses, 4; mules, 10; donkeys, 31; heifers, 101; bulls, 2; sheep and goats, 2,654. From Northern Rhodesia:—Oxen, 2,798.

February, 1915.

AFRICAN COAST FEVER.

Salisbury District.—On the farms Epworth and Bluff Hill 5 and 16 head respectively were destroyed. No fresh cases at any of the other infected centres.

Umtali District.—No fresh cases at any of the infected centres.

Melsetter District.—Two fresh outbreaks occurred—(1) on the already infected farm Nooitgedacht, amongst a small herd (14 head) of native cattle, 10 deaths occurred; (2) on the farm Avontuur a herd of 47 head became infected—6 deaths occurred. On the farm Nooitgedacht 14 deaths occurred; total mortality, 49 head. On the farm Clearwater 63 deaths; total mortality, 87 head. On Springfield no fresh cases occurred.

TUBERCULOSIS.

One bull and one heifer tested, with negative results.

GLANDERS.

Thirty-five donkeys tested with mallein on importation, with negative results.

SARCOSPORIDIOSIS.

Sarcosporidia were found in muscle smears from a Northern Rhodesia ox. The existence of these parasites is recorded in view of the fact that they are suspected of being connected with the etiology of gallamsickness.

EPHEMERAL FEVER (THREE DAY SICKNESS).

This disease still prevails throughout the Territory.

ANAPLASMOSIS.

(Gallsickness.)

PIROPLASMOSIS.

(Redwater.)

Considerable mortality from these diseases is reported, but not quite so heavy as for the preceding month. Many locally-bred animals have been affected.

HORSE-SICKNESS.

The mortality from this disease is exceptionally heavy; over 540 deaths (horses and mules) were reported to the Department.

IMPORTATIONS.

From the South:—Donkeys, 35; heifers, 138; sheep and goats, 4,173. From Northern Rhodesia:—Oxen, 963.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Farming Calendar.

April.

BEE-KEEPING.

To prevent robbing contract entrances, be certain there is enough honey in the brood chamber to carry bees through the winter. Carefully clean and store away all appliances ready for next season. Give hives one or two coats of good paint. Where colonies are queenless or weak, unite by previously dusting both lots with household flour. Where considered necessary to feed for winter, it should be done now. Put on extra coverings over frames to preserve warmth during the winter.

CITRUS FRUITS.

Citrus orchards should be cultivated and the ground hand-hoed immediately under the trees.

CROPS.

The rains are practically over by this month, and the harvesting of early crops such as buckwheat, linseed, teff grass and manna will commence. The silo pit should be got ready, and the making of ensilage should be undertaken during this month. Napier's fodder can now be cut for this purpose. Veld hay for feeding should not be cut later than the end of this month. All lands that are available should be ploughed. The preparation of vleis for winter crops should be continued, and late crops, such as Algerian oats, should be sown this month; also barley for an early green crop.

DECIDUOUS FRUITS.

Orders should be given to the nurseryman for trees required in August, September or October. Trees will be lifted in August, and may with advantage be kept in cool storage till required.

ENTOMOLOGICAL.

Maize.—"Earworms" are sometimes troublesome in the tassels and ends of the cobs, but this pest cannot be directly attacked. Caterpillars may attack the crop, on account of their food being suddenly destroyed by late cultivation after the weeds have been allowed to get too far ahead.

Tobacco.—Any remaining plants shewing stem borer attack should be removed and burnt.

Potatoes.—Should be systematically cultivated and hilled, to keep tuber moth from the tubers.

Cabbage Family.—Plants of this family are liable to suffer severely from cabbage louse and Bagrada bug.

Beans and Cowpeas.—Insect attack on these plants is but little obvious during April.

Dahl.—Suffers much from blister beetles destroying the blossom during April. Hand picking is the only remedy.

Citrus Trees.—Collect and destroy infested fruit, to keep down citrus codling.

FLOWER GARDEN.

Sow sweet peas. Hardy annuals, such as candytuft, cornflower, eschscholtzia, gypsophillia, larkspur, mignonette, poppy, etc., may be sown in the open ground, and should not be transplanted. Perennials may be sown in boxes.

FORESTRY.

Prick out into tins the young trees raised from the seed sown in February. Any breaking up left over from last month should be completed this month; also any fire lines left unploughed.

POULTRY.

Adult stock should have completed the moult by now, and may be put on a laying ration. Breeding pens should be mated up. If pullets are used in the pens they should be mated with a two-year-old male bird. Any birds which have not completed the moult should not be used in the pens. Do not breed from all and sundry. Carefully select your breeding stock, and handle each bird. Discard all with crooked breast-bones, wry-tails, in-knees, crooked toes or other serious defects. Select as many as possible that have already started to lay. Remember the male bird is more than half the pen. Above all, do not give your breeding birds a forcing laying food; it is not the quantity of eggs you should look or, but the quality. Spring hatched birds from Australia may now be imported.

STOCK.

Cattle.—Cattle on the ranch should require little attention beyond dipping. Bulls should be kept out of the herd if January calves are not desired. Dairy cattle will require a ration of crushed or ground maize and some succulent food, such as green maize stalks, Napier's fodder or ensilage, if any of the latter has been left over from last year. Calves should be supplied with green fodder and a ration of maize meal, together with some more nitrogenous food, such as bean meal, pea meal, buckwheat meal, or linseed meal. Care should be taken to provide supplementary food to all cattle before they lose any appreciable amount of flesh, in order that mid-winter may not find them in poor condition. All preparations for making ensilage should be completed by the beginning of the month. Any haymaking still undone should be attended to without delay, weather permitting. Attention should be given to water supplies for winter, and arrangements made to prevent water holes, etc., being trodden in as the supply shortens.

Sheep.—If grass seeds are troublesome, an area should be mown for grazing. Sheep should not be allowed to graze in the vleis. If the ram is put in now, lambs will be born in September, which may be considered somewhat early by some breeders.

TOBACCO.

Tobacco curing should be completed this month.

VEGETABLE GARDEN.

Potatoes require ridging and tomatoes staking and tying up. Potatoes which mature after the rains may generally remain in the soil and be lifted as required. Vegetables planted out for winter crops should be well and continuously cultivated, which will bring them along quicker, with less watering. Beans and peas should be staked and tied. Beans, carrots, cabbage, cauliflower, peas, turnip, spinach, beet and radish should be sown for late winter crops.

VETERINARY.

Horsesickness will be prevalent this month, as will blue tongue in sheep. The first symptom is laminitis, the second a protruding blue tongue.

WEATHER.

Along the higher ridges of the country we may still look for an inch of rain, more or less, during the month, though little, if any, can be expected in the Zambesi and Limpopo valleys and all low-lying parts of the country. As often as not, however, April is a dry month. In past years it has occasionally happened that early frosts have been recorded which put an end to the tobacco harvest, and may kill tender vegetables and flowers; but, as a rule, no such calamity need yet be expected, and if at all, only in frosty hollows.

May.

BEE-KEEPING.

Where necessary, contract the space in the brood chamber, by removing one or two frames not covered with bees, and close up the division boards towards the centre of the cluster. Then pack above the frames several thicknesses of woollen clothing; above this put some neatly folded newspapers. This attention to the welfare of the bees will conserve warmth, and enable them to winter much better. Considering that bees are able to take almost daily flights at this season, little attention need be devoted to feeding, for they can usually find sufficient food to carry them through winter. Be on the look-out for hunger swarms, this and next month, and where it is considered advisable to secure them, they should be placed, late in the afternoon, into a frame hive properly fitted up, and fed inside the hive. After hiving them, a narrow strip of excluder zinc should be placed securely at the entrance to prevent the escape of the queen. If it is seen that the queen is laying at the end of a month, the strip may be removed, but feeding must be continued about twice a week until the spring approaches.

CITRUS FRUITS.

Cultivate the entire citrus orchards once a month, scuffling round every tree by hand once every two months.

CROPS.

Crops such as summer wheat will be ready for harvesting. Majorda melons should be carted to some convenient spot, but not heaped. Ploughing should be continued on all available lands. Winter crops in vleis, such as Early Gluyas and other wheats, New Zealand oats and barley, should all be sown not later than this month. Napier's fodder may still be cut for ensilage during this month. This will give time for a considerable aftergrowth, which can serve as winter pasture.

ENTOMOLOGICAL.

Cabbage Family.—Plants of this family are liable to suffer greatly from cabbage louse and Bagrada bug during May. For the former, spray with soap and tobacco wash, which may help if the plants are not too big.

Dahl.—Blister beetles are still injurious to the blossom of the crop, and should be regularly collected and destroyed.

Citrus Trees.—Continue to collect and destroy all fruits infested with citrus codling.

Guava.—Fruit fly and citrus codling breed in these fruits during the autumn and winter.

FLOWER GARDEN.

Sow *in situ* cornflower, larkspur, mignonette, poppy; sweet peas may also be planted.

FORESTRY.

Complete pricking out into tins. Strike cuttings of species that are propagated in this manner, such as poplars. If it is intended to use the saltpetre method of eradicating stumps, the trees should be felled this month.

POULTRY.

If the means of incubation is limited, hatch the heavy breeds first, as they take longer to mature. Hatch as early as possible, to get your birds well grown before the rains, as they will make very much better development during the dry months. Do not breed from turkeys till they are fully matured. Two-year-old hens and a three-year-old male bird will be found to give the most satisfactory results. Very heavy male birds should not be used. As is the case with fowls, in breeding for size, we get this from the hens, which should be large and possessing straight keels. Get the turkeys on to lay as soon as possible. Eight or nine-month-old birds are the best for market purposes.

STOCK.

Cattle.—Ranching cattle may still be expected to be in good condition, especially having regard to this present season. Dairy cattle should be treated much the same as is recommended for the month of April, but the ration should be increased somewhat; especially the succulent portion. Grass may still be cut for bedding, and both cows and calves should be well bedded down at night from now onwards. Maize will probably be in fit state for making into ensilage, and towards the end of the month maize hay may be made after the removal of the cobs. The vines of monkey nuts when reaped should be carefully preserved for fodder. Cowsheds should be put in good repair against the cold winter nights.

Sheep.—The vleis having dried, sheep will probably do better in the lower lying lands. If the ram is put in now, lambs will be born in October, which is usually a good month to arrange for. Those who favour winter lambs, and have ewes lambing now, will find a few handfuls of maize a great help to the ewes in providing milk.

TOBACCO.

Tobacco will be sent to the warehouse this month. The work of preparing the land for the next crop shou'd now be taken in hand. The stalks of the old crop should be taken out and burnt.

VEGETABLE GARDEN.

Sow broad beans, peas, lettuce, spinach, parsnips, carrots, radish and beet. Constant cultivation is necessary.

VETERINARY.

Horse-sickness will still be in evidence, and may be expected to continue until the frosts occur. Inoculation for blue tongue should be performed in the dry season only, unless the animals can be kept under cover for 21 days. Do not inoculate ewes in lamb on account of abortion. Inoculated animals spread the disease for 21 days. Scab is a poverty winter disease.

WEATHER.

The dry season should have now set in, though averages of from a quarter of an inch to three-quarters are indicated in the official reports. Ground frosts at night have been recorded, but are very unusual.

Union Produce Mart.

The Union Produce, Ltd., Port Elizabeth, report as follows:—

Wool.—London sales closed very firm, shewing an advance of 10 per cent. Excellent demand for all descriptions of wools, especially light combing wools, which are selling at extremely high rates.

Our local market continues very firm, and there is an excellent demand for all wools of light descriptions, and especially any combing lots. Prices realised for such wools are extremely high, and competition continues very keen. All other descriptions continue in good demand, and are being sold at slightly advanced rates. Our opinion is that the market will remain very firm, and we think that it would be advisable for you to continue consigning freely. We have sold at some excellent prices this week, especially for Free States, and have realised as high as 9¼d. for nice parcels, and 6d. to 6½d. for ordinary medium to long descriptions. We have also sold a fair quantity of both Transvaal and Cape wool, for which we have been able to realise very satisfactory prices. Generally speaking, the outlook is very good.

Hides.—Sundried, 12d. per lb., less 1½d. per lb. for damages; dry salted, 11d. per lb.

Market Reports.

The produce market at Salisbury is well supplied with all lines. There is a glut of potatoes, and mealies are plentiful. Eggs are scarce at Bulawayo and Salisbury, but good supplies of local butter are coming forward.

There is a fairly good demand at Salisbury for dairy stock, but practically no enquiry for trek bullocks or native cattle. There are plenty of sellers, but no buyers. Slaughter stock is plentiful. A good demand for mules is expected shortly, and the market is starting to move. There is no demand for donkeys.

Mr. A. G. Hay of Bulawayo held a successful cattle sale at Plumtree on the 16th February, something like £5,000 changing hands. The prices of the stock which were sold were as follows:—Old cows, with calves, £4 2s. 6d. to £6 10s.; dairy cows, £11 to £15; cross-bred Aberdeen Angus heifers, £8 5s. to £11 10s.; local-bred heifers, £4 7s. 6d. to £6 17s. 6d.; colonial heifers, £6 2s. 6d. to £15; slaughter oxen, £8 15s. to £9 10s. (these cattle averaged out at from 32s. 6d. to 35s. per 100 lbs.); trek oxen, £7 12s. 6d. to £8; young trek oxen, £5 15s.; tollies, £3 10s. to £4 17s. 6d.; young donkeys, £3 10s.

At Mr. A. E. White's quarterly sale held at Gwelo on the 17th February, about 500 head of cattle and several hundred sheep and goats were offered. Buyers were not numerous and prices ruled low. Slaughter stock realised 27s. 6d. per 100 lbs.; native cows, £5 to £8 5s.; bulls, £9 to £20; store cattle, £2 to £3 10s. There was very little demand for good dairy cows. A choice selection of pedigreed Lincoln Reds—a bull and several heifers—were withdrawn, the highest bid being considerably below the reserve figure. Goats were sold at 12s. The sheep penned were a fine lot of Persians, Merinos and woolled Persians, but there was no demand. We understand the auctioneer is prepared to receive offers for the Lincoln Red cattle.

At Messrs. Pinches & Co.'s usual cattle sale on the 17th March there was a fair attendance of buyers, and a large number of cattle, also sheep and goats, passed under the hammer. The demand, as usual, was good for slaughter stock, but breeding cattle shewed a further drop in value. Good bulls were also not much in demand, and there were practically no buyers for donkeys. Young store animals fetched about the market value. No high prices were reached for any animals. Trek oxen were again not in much demand. The price of slaughter stock was much the same as at the sale held a fortnight previously, the average price being about 37s. 6d. per 100 lbs.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs.	10/0 13/0	—	—	25/0
Beans, 203 lbs.	16/0 25/0	—	—	25/0 32/6
Boer Meal, unsifted, 200 lbs.	—	—	48/6	45/0
Bran, wheaten, 100 lbs.	6/0 6/3	—	13/0 14/0	14/0 15/0
Flour, 100 lbs.	—	—	—	25/0 27/6
,, Colonial, 100 lbs.	—	—	27/6 30/0	—
Forage, 100 lbs.	3/6 7/0	4/6 6/6	10/0 11/0	9/6
,, Colonial Oat	6/9 7/6	—	—	—
	Bale.		Ton.	
Hay	4d. 9d.	—	50/0 56/0	30/0
Kaffir Corn, 200 lbs.	8/6 10/8	11/0	16/6 17/6	—
Manna, 100 lbs.	3/0 3/6	—	—	4/6 5/0
Mealies, S.A. White, 203 lbs.	12/0 13/0	11/0	13/6 15/0	9/6 10/6
Mealies, Yellow, 203 lbs.	13/5 14/0	13/0	—	—
Mealie Meal, White, 183 lbs.	—	—	—	9/6 10/6
Munga, 200 lbs.	—	—	—	12/0 13/0
Monkey Nuts, bag, 83 lbs.	—	—	12/0 13/6	7/0 8/0
Oats, 150 lbs.	13/0 13/6	—	—	22/6 25/0
Onions, 120 lbs.	7/6 9/6	3/0 9/6	—	18/6 20/0
Peas, 200 lbs.	19/0 25/0	—	—	—
Potatoes, new, 150 lbs.	8/0 11/6	4/0 13/0	14/0	5/0 7/6
,, old, 150 lbs.	4/0 7/0	—	—	—
Rapoko	—	—	—	8/0 9/0
Rye, 200 lbs.	21/0 22/0	—	10/0 11/0	—
Salt, 200 lbs.	4/0	—	—	11/0
Wheat, 203 lbs.	30/0 34/0	—	—	30/0 32/6
Butter, local, per lb.	9d. 1/2	9d. 1/0	1/3 1/6	1/6 2/0
Eggs, local, per dozen	1/3 1/8	9d. 1/7	4/0	3/0 4/0
Ducks, each	2/3 2/11	2/4 3/0	—	3/6 5/0
Fowls, each	1/3 2/6	1/0 1/11	—	2/6 4/6
Geese, each	3/6 4/6	—	—	7/6 9/0
Turkeys, cocks, each	7/6 16/0	6/6	—	12/6 17/6

LIVE STOCK.

Slaughter Cattle, 100 lbs.	34/6 35/0	—	27/6 35/0	35/0 37/6
Trek Oxen, trained	£6/5 £7/10	—	£6 £10	£8 £10
Local Cows, milk	—	—	£12 £17/10	—
Dairy Cows	£15 £30	—	£20 £30	£20 £25
Native Cows	—	—	—	£5 £8
Heifers, Colonial	£5 £8	—	£8 £17	£7 £9
,, Native	—	—	—	£4 £7
Pigs, live weight	2⅜d. 4¼d.	—	—	4d. 4½d.
Horses, riding, salted	—	—	—	£35 £45
,, ,, unsalted	£13/15 £22	—	£12 £22/10	£22 £30
Mules, inoculated	£11 £23/10	—	£25 £35	£20 £25
Donkeys, geldings	—	—	£3/10 £7	£4 £7
,, mares	—	—	£5 £7/10	£5 £8
Goats	7/6 12/0	—	8/6 12/0	12/6 15/0
Persian Ewes	—	—	—	20/0 22/6
Cross-bred Ewes	10/0 13/0	—	—	17/6 20/0
Sheep, slaughter	7/6 17/6	—	13/0 22/0	20/0 25/0

Weather Bureau.

TEMPERATURES.

STATION	JANUARY		FEBRUARY	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MASHONALAND—				
Bindura, Melfort Estate	74·1	70·3	83·9	66·9
Hartley, Gatooma	84·1	—	68·8	—
,, Hallingbury Farm	84·6	65·0	81·3	62·6
Inyanga, York Farm	—	—	72·8	56·3
Lomagundi, Eldorado Mine	83·06	65·22	82·5	64·2
,, Sinoia	83·7	64·7	71·3	63·8
,, Sipolilo	83·3	63·5	—	—
Mazoe, Shamva Mine	83·5	66·7	81·7	66·2
Melsetter	77·8	—	—	—
Salisbury, Chishawasha	79·7	63·8	79·6	61·4
,, The Gaol	80·3	60·3	78·6	59·8
,, Agric. Dept. Offices	77·4	62·0	77·9	59·5
Umtali, Chiconga's Location	85·7	66·4	81·9	64·1
,, Summerfield	74·4	65·4	71·1	62·5
,, High School	83·4	67·2	82·8	63·5
Victoria	82·8	65·9	79·6	61·8
MATABELELAND—				
Bulawayo, Essexvale	81·29	66·29	—	—
,, Observatory	78·0	63·9	77·1	59·9
,, Rhodes Matopo Park	82·5	63·2	—	—
Gwelo	79·3	—	78·8	—
Gwelo, Iron Mine Hill	—	—	78·3	58·9
Mangwe, Empandeni	—	—	81·5	—
Tegwani	84·3	—	83·2	—
Tuli	93·7	70·7	92·5	66·8
Victoria Falls	—	—	85·2	57·8
Wankie	85·3	—	—	—
,, Guyo	69·7	65·6	—	—
West Gwanda, Antelope Mine	—	—	82·10	63·69

RAINFALL.

STATION	January	February
MASHONALAND :		
Charter—		
Buhera	11·05	3·65
Driefontein	17·71	3·90
Enkeldoorn	—	—
Grootfontein	18·66	4·35
Indiva Farm	—	5·60
Marshbrook	12·59	4·95
Riversdale	13·94	9·35
Spitzkop	14·47	4·34
The Range	16·97	6·94
Umvuma (Railway)	17·19	4·17

RAINFALL—(*Continued*).

Station	January	February
Mashonaland—(Continued)		
Hartley—		
Ardgowan	10·01	8·42
Auchter Leny	11·59	5·70
Battlefields (Railway)	8·22	6·68
Beatrice Mine	13·29	7·63
Carnock Farm	10·27	6·71
Clifton Farm	13·65	8·96
Elephant Hill, Battlefields	4·94	—
Elvington	11·62	6·00
Franceys	33·55	17·23
Gatooma (Railway)	9·77	8·11
Gatooma	9·58	8·03
Gadzema	13·48	10·03
Giant Mine	—	—
Gowerlands	10·34	5·76
Hallingbury	8·71	8·09
Hartley (Railway)	13·09	10·24
Hartley (Gaol)	—	—
"Jenkinstown"	10·69	3·65
Makwiro	11·17	4·25
M'pofha Farm	11·51	—
Norton Siding	—	—
Shagari	11·40	8·95
"Stoneygate"	9·90	6·78
Lomagundi—		
Banket Junction (Railway)	10·67	7·90
Darwendale	6·42	12·93
Duxbury Farm	6·79	6·62
Eldorado Mine	9·01	9·23
,, (Railway)	8·97	9·25
Golden Kopje Mine	9·37	4·57
Kanyemba	—	—
Lone Cow Estate	9·93	8·90
Longmead	7·61	7·15
Palm Tree Farm	10·27	9·17
Sinoia	7·24	6·18
Sipolilo	7·04	6·25
Umvukwe Ranche	8·78	—
Makoni—		
Chimbi Source	14·12	7·36
Eagle's Nest	15·15	10·49
Ellavale	15·52	6·05
Inyanga	12·88	8·51
Inyazura	15·19	8·66
Mona	—	—
Monte Cassino Mission	12·80	6·81
Odzi (Railway)	21·54	—
River Junction	—	—
Rusape (Railway)	11·77	6·87
Rusape	—	—
Springs	10·80	8·21
St. Trias' Hill	14·13	7·93
York Farm	14·67	6·84

RAINFALL—(*Continued*).

STATION	January	February
MASHONALAND—(Continued)		
Mangwendi—		
Bonongwe...	20·15	4·71
Glen Somerset	12·96	11·49
Land Settlement Farm	20·72	8·69
Macheke (Railway)	15·17	5·24
Marandellas	11·83	—
Marandellas (Railway)	11·35	5·18
Marandellas (Huish Estate)	23·74	5·02
Mrewa	14·01	—
Mtoko	9·67	9·65
Mungo	18·22	—
Rusawi Outspan	—	—
Selous Nek	14·82	8·68
Theydon	13·91	4·98
Tweedjan	24·85	3·89
Mazoe—		
Avonduur	8·78	—
Bindura (Railway)	10·25	11·45
Bindura	11·23	10·93
Ceres	11·15	11·24
Chipoli	8·49	12·62
Claverhill	9·48	12·20
Darwin	10·73	11·74
Dunmaglas	8·28	9·20
Fairview	7·43	9·05
Jumbo	6·18	8·08
Kilmer	7·78	7·60
Laguaha	8·63	8·78
Lowdale	9·04	7·80
Mazoe	8·79	—
Mguta Valley	—	—
Omeath	11·54	9·04
Ruia	11·48	10·31
Shamva	6·26	9·92
,, Mine	7·14	9·92
Sleamish	—	—
Stanley Kop	5·72	7·80
Sunnyside	6·36	8·68
Teign	6·43	8·18
Umvukwe Flats	8·34	9·75
Melsetter—		
Chikore	12·59	11·25
Chipinga	15·25	—
Helvetia	22·65	16·52
Melsetter	18·03	9·48
Mount Selinda	—	—
Mutambara Mission	12·17	6·82
Pasture	8·40	9·44
Tom's Hope	12·65	9·13
Vermont	—	12·04

RAINFALL *(Continued)*.

STATION	January	February
MASHONALAND—(Continued)		
Salisbury—		
Avondale	10·14	10·76
Brookmead	10·72	4·02
Chishawasha	12·85	11·66
Cleveland Reservoir	10·92	8·47
Glenara	6·38	9·96
Goromonzi	12·63	11·24
Gwibi	7·09	—
Lilfordia	8·97	7·42
Meadows	12·14	6·37
Salisbury (Gaol)	13·91	6·37
,, (Agricultural Department Offices)	14·92	9·70
,, (Club)	13·89	8·26
,, (Railway)	12·95	6·49
,, (Hillside)	12·56	8·48
Sebastopol	10·82	13·73
Selby	4·57	—
Stapleford	7·49	8·47
Westridge	13·58	—
Umtali—		
Chiconga's Location	14·48	5·14
Odzani	10·15	5·22
Odzi	—	6·06
Penhalonga	15·00	7·99
Premier Estate	16·16	6·14
Stralsrund	7·92	9·24
Summerfield	10·62	9·04
Umtali (School)	12·57	4·45
,, (Railway)	12·70	5·40
Utopia	12·65	6·78
Victoria—		
Chibi	13·63	2·99
Chilimanzi	12·24	—
Chingombe	10·08	7·10
Chiredzi Ranche, Ndanga	12·98	6·15
Clipsham	20·11	4·61
Empress Mine	—	4·11
Eythorne	15·18	7·18
Gokomere	13·74	5·03
Gutu	11·42	7·01
Hanyanya (Bikita)	16·39	13·37
Makorsi River Ranche	15·01	4·86
Marah Ranche	9·35	8·21
Marthadale	15·74	—
Morgenster	18·02	5·69
Ndanga	18·99	8·06
Noeldale	13·24	8·30
Pamushana	15·93	4·98
Silver Oaks	25·32	5·47
Tokwe River Ranche	19·40	3·34
Victoria	17·69	4·76
Victoria, Fort	—	5·15

RAINFALL *(Continued)*.

Station	January	February
MATABELELAND :		
Belingwe—		
Albany	10·51	4·08
Anglo-French Block	16·13	5·05
Filabusi	20·08	4·25
Fort Rixon	13·16	5·06
Infiningwe	21·63	4·96
Insiza South	—	4·96
Insiza (Railway)	11·20	5·80
Mooifontein	—	—
Shangani (Railway)	13·78	4·68
Tamba	14·33	3·24
Thornville	11·91	4·75
Widza	22·21	5·32
Bubi—		
Inyati	11·33	3·60
Leighton	12·37	—
Lochard Experiment Farm	15·27	5·52
Bulalima—		
Figtree	—	—
Mholi (late Magot)	12·09	4·16
Marula	19·87	—
Plumtree School	—	—
Riverbank Farm	19·50	2·48
Solusi	16·72	2·63
Syringa	12·80	3·22
Tegwani	20·82	1·63
Vlakfontein	—	—
Bulawayo—		
Balla Balla (Railway)	13·58	3·02
Bembesi (Railway)	10·22	4·00
Bulawayo (Railway)	—	3·45
Essexvale	17·48	4·87
Government House	13·16	—
Gwaai (Railway)	12·43	6·91
Heany Junction (Railway)	14·80	—
Hope Fountain	19·08	—
Imbesu Kraal	14·59	3·68
Keendale	12·17	1·70
Khami	13·07	1·38
Lower Rangemore	12·63	3·75
Matopo Mission	19·57	5·84
Maxim Hill	12·37	5·39
Melinakanda Junction	13·11	3·09
Nyamandhlovu, Edwaleni	13·57	7·08
Nyamandhlovu (Railway)	21·17	4·75
Observatory	12·74	3·35
Pendennis	—	—
Raylton	13·73	—
Rhodes Matopo Park	23·20	7·77
Umgusa	11·64	—
Umkien	—	—

RAINFALL *(Continued)*

Station	January	February
MATABELELAND—(Continued)		
Gwanda—		
Gwanda (Gaol)	22·30	2·01
,, (Railway)	21·57	2·04
Malundi	15·50	1·64
Mtshabzi Mission	21·54	3·52
West Nicholson (Railway)	16·60	0·83
Gwelo—		
Coppy Nook	17·92	5·99
Globe and Phœnix (Railway)	11·21	3·80
Grafton	14·19	7·77
Gwelo (Gaol)	10·55	9·19
Gwelo (Railway)	11·49	8·45
Lalapanzi	17·12	4·90
Lalapanzi (Railway)	18·41	4·84
Lower Gwelo	9·63	4·82
Que Que	11·76	3·89
Rhodesdale Estate	15·97	3·72
Selukwe (Railway)	13·52	8·64
Shangani	—	4·68
Sikombela Farm	9·29	9·35
Umhlali Farm	15·29	—
Mafungabusi—		
Gokwe	8·88	5·71
Inyoka	6·54	4·39
Mangwe—		
Empandeni	19·97	4·76
Garth	14·64	3·86
Tuli—		
Lamulas	14·98	3·43
Langalanga	15·62	2·86
Makalali	12·38	4·90
Manantji	19·47	2·64
Manyoni	—	—
Mazunga	15·09	—
M'pande	18·61	3·07
Tuli	9·33	1·88
Umzingwane—		
Crombie's	19·65	3·74
Wankie—		
Bombusi	11·52	2·30
Guyo	10·69	—
Livingstone (Railway)	—	6·96
Malindi (Railway)	10·22	5·13
Victoria Falls	—	5·76
Victoria Falls (Railway)	11·62	4·94
Wankie (Railway)	15·46	3·61

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1915		
			April	May	June
Bindura	Bindura	A. C. Mills	10	..	12
Charter—Mgezi	Beatrice Mine	W. Krienke	28	26	30
Central	Umvuma	—	30	28	25
Enterprise	Arcturus Hotel	J. Watson	7	5	2
Felixburg	Umvuma	E. C. Boardman	24	29	26
Figtree Branch, R.L. and F.A.	Figtree Hotel	A. Curtis	..	..	..
Gatooma	Gatooma	—	17	15	19
Gazaland	Chipinga	W. Wood	29	..	..
Greystone	Roodeheuvel, Shangani	J. W. Spencer	10	8	12
Hartley	Hartley	H. Savory	10	8	5
Headlands	Headlands	— —	..	..	.
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. W. Twilley	10	8	12
Insiza Shangani	Shangani	N. C. St. J. Brislin		..	5
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	10	8	12
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	..	..	..
Lomagundi	Sinoia	W. Abbott	17	15	19
Macheke	Macheke	H. H. Kidson	..	1	..
Makwiro	Makwiro	F. R. McLellan	16	21	18
Marandellas	Marandellas Farmers' Hall	E. P. de Kock	3	1	5
Mangwendi	Fixed every meeting	Luke Green	5	.	2
Makoni	Rusape	H. Barnes Pope	3	..	5
Marula	Marula Siding	Mac. W. Ingram	24	22	26
Mashonaland	Commercial Hotel, Salisbury	W. H. Williamson	10	8	12
Matopo Branch, R.L. and F.A.	Sibali	W. Bathurst	..	12	..
Mazoe	Glendale Siding	R. Newett	14	12	9
Melsetter (North	Various farms	Rev. R. Wodehouse	..	..	5
Midlands	Gwelo	C. H. B. Mercer	10	8	12
Northern Umtali	Farm "Summerfield"	R. V. H. Blurton	..	1	..
Norton and District	Norton Siding and various farms	—	..	..	4
Que Que	Globe and Phœnix Hotel	E. E. Somerset	17	15	19
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	30	28	25
Shamva	Shamva	J. M. Moubray	No	dates fixed	
Southern Insiza	Peggy Hotel, Insiza	W. J. B. Harris	4	2	6
Selukwe	Selukwe	F. S. Clark	No	dates fixed	
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	8	..
Umvukwe	Various farms	—	No	dates fixed	
Umtali	Christmas Pass Hotel	J. S. Holland	3	1	5
Victoria	Victoria	H. S. Hoatson	21	19	16
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	10	8	12

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a ¼ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, in

which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of

good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—
Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases

where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil

Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making: building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

No. 2. The Possibilities of Rhodesia as a Citrus Growing Country, by R. McIlwaine, M.A., LL.B.
No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
No. 62. Services of Agricultural Engineer.
No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.
No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
No. 94. Second Report on Experiments, by J. H. Hampton.
No. 125. Subterranean Water, by W. M. Watt.
No. 153. Citrus Fruit Trees—From Seed to Grove.
No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.
No. 156. Elephant Grass or Napier's Fodder, by J. A. T. Walters, B.A.
No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.
No. 164. Citrus Fruits in Rhodesia—Suggestions as to where to Plant, by C. E. Farmer.
No. 166. Rhodesian Citrus Fruits—Exportation to London.
No. 173. Citrus Fruits : Cultivation and Pruning, by C. E. Farmer.
No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.
No. 182 Some Citrus Growing Experiences in Rhodesia, by R. McIlwaine, M.A., LL.B.
No. 185. Citrus Fruits—The Preparation of Oranges for Market, by C. E. Farmer.
No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.
No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.
No. —. Orange and Lemon Growing in Southern Rhodesia, by R. McIlwaine.
No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.
Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
No. 106. Cultivation and Preparation of Ginger.
No. 126. Turkish Tobacco.

No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.

No. 138. Tobacco Culture (Virginia)—Harvesting and Curing.

No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.

No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.

No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.

No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.

No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.

No. 179. Buckwheat, by H. G. Mundy, F.L.S.

No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.

No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.

No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.

No. 194. Rye, by J. A. T. Walters, B.A.

No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.

No. 58. Onion Thrips, by R. W. Jack, F.E.S.

No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.

No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.

No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.

No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.

No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.

No. 147. Root Gallworn, by R. W. Jack, F.E.S.

No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.

No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.

No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.

No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.

No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.

No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.

No. 178. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.

No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.

No. 197. Chafer Beetles, by R. W. Jack, F.E.S.

No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.

No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.

No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.

No. 74. The Detection and Prevention of Diseases of Stock in Rhodesia, by Ll. E. W. Bevan, M.R.C.V.S.

No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.

No. 95. Oestrus-ovis in Sheep, by Alec King.

No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.

No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.

No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.

No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.

No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.

No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.

No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

Conditions under which Government Veterinary Surgeons' Services are available to the public.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.

No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.

No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.

No. 163. Feeding and Care of Imported Cattle, by R. C. Simmons.

No. 167. The Construction of Dipping Tanks for Cattle.

No. 169. The Breeding and Feeding of Pigs for Bacon Factory Purposes, by R. C. Simmons.

No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.

No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.

No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.

No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.

No. 149. Dry Season and Droughts in Rhodesia, by Rev. E. Goetz, S.J.

No. 150. Dry Season and Droughts in Rhodesia, by the Rev. E. Goetz, S.J.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 157. Hints on Brickmaking, by G. T. Dyke.

No. 159. Gwelo Creamery : Hints and Suggestions to Farmers, by W. G. Elliott.

No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

Malarial Fever : How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

The Prevention and Treatment of Blackwater Fever, by Dr. A. M. Fleming.

Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law : Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc.

HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

T. F. Mc.—Practical man to manage farm; experienced in cattle management.

H. C. M.—Wanted on general farm, Gwelo district, farm assistant. Salary £5 per month, board and lodging.

SITUATIONS WANTED.

L. R. H.—As farm manager or assistant. Thorough knowledge of agriculture, etc.; also dairying and cattle; practical knowledge of most farm work and well up in oil engines, etc. State salary.

W. S.—Colonial requires responsible position on farm; seven years' experience; thoroughly understands cattle, small stock and grain crops. Percentage of crops, etc., or salary.

C. H. C.—Late foreman of Government House, Bulawayo; well up in general farming, market gardening, fruit and forestry.

C. B.—As general assistant; good knowledge of brickmaking and bricklaying; experience in all crops, including cattle, also handling of cattle.

V. T.—As tobacco man; experience in Java, United States and Nyasaland.

P. G. C.—As manager of farm. Experience in all branches of farm work.

J. H., A. McK., C. W.—All aged 18 years, wish to learn farming in Rhodesia.

J. E. W.—Youth, aged 16, desires employment on ranch to gain experience.

W. E. R.—Employment wanted in pruning trees. Thoroughly experienced; worked in California and with Mr. Pickstone, Cape Colony.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:—*

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed

by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

Veterinary Districts of Southern Rhodesia.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 24 of 1914.] [14th January, 1914.

(As amended by Nos. 207 and 395 of 1914.)

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 82, 129, 143, 258, 297 and 326 of 1913, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas :—

(2) Native District of Salisbury.

(a) *Areas of Infection.*

(1) Hatfield Estate and Hatfield Plots.
(2) Salisbury Commonage.
(3) M.T.C., Gallagher's Lease and Makabusi farms.
(4) Epworth, Adelaide and Glenwood farms.

(b) *Guard Areas.*

(1) The farms Haydon and Good Hope.

(2) The farms Warren, Lochinvar, the eastern sub-division of Willowvale, Makabusi Outspan, Ardbennie Township, Waterfall, Hopley, Saturday Retreat, Odar Outspan, Stoneridge, Spreckley, Eyrecourt, Eyerston, Retreat, Prospect, Bunker's Hill, Adair, Boutelle, Godavery, Twentydales, Deanesbrook, Nalire Native Reserve, Galway Estate, Mayfair. Sebastopol, Dispute, Caledonia, Donnybrook, Greengrove, Ventersburg, Lorelei, Letombo Reserve and Greendale.

(3) Native District of Umtali.

(a) *Areas of Infection.*

The farms N'odzi and Nyagari, and the Penhalonga Valley.

(b) *Guard Area.*

The farms Mabonda, Mountain Home, Umtali Mission, Imbeza Valley, Duris and Forest Farm.

No. 239 of 1914.] [4th June, 1914.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard area in the native district of Salisbury.

(a) *Area of Infection.*

The farm Bluff Hill.

(b) *Guard Area.*

The farms Crowborough, Parkridge, Fontainebleau, Reserve, Tynwald, Mabel Reign, Avondale, Gillingham, Rainham, Stamford, Homefield, Dovedale, Stapleford, Glen Lussa, St. Marnocks, Kinvarra, Selby, Mount Hampden, Mount Hampden Reserve, Bendaugh, Glenara, Eskbank, Oldbury, Komani, Hinricksen, Thorn Park, Zizalisari Outspan, Mount Pleasant, Teviotdale, Vainona, Pomona.

No. 449 of 1914.] [22nd October, 1914.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Tynwald, in the native district of Salisbury, to be an area of infection.

No. 86 of 1915.] [25th March, 1915.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease, to wit, African Coast Fever, on the farm Sigaro, in the native district of Salisbury, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the undermentioned area to be an area actively infected with African Coast Fever for the purposes of the said Ordinance :—

An area bounded by and including the following farms : Sigaro, Patterson, Mgutu, Pearson Settlement, Passaford, Spa, Weltevreden, Bitton, Syston, The Lily, Ballineety, Penrose, Derry and Forest Reserve.

No. 87 of 1915.] [25th March, 1915.

AFRICAN COAST FEVER.

I DO HEREBY, in terms of section 12 of the regulations published under Government Notice No. 50 of 1912, declare the following area of infection and guard area in the Salisbury and Mazoe native districts for the purposes of the said regulations :—

(*a*) *Areas of Infection.*

(1) Sigaro Farm ; (2) Mabelreign Farm.

(*b*) *Guard Area.*

An area bounded by and including the following farms : Patterson, Mgutu, Pearson Settlement, Passaford, Spa, Weltevreden, Bitton, Syston, The Lily, Ballineety, Penrose, Derry and Forest Reserve.

No. 506 of 1914.] [10th December, 1914.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of a destructive disease, to wit, African Coast Fever, on the farm Nooitgedacht, in the native district of Melsetter, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the above-mentioned farm to be an area actively infected with African Coast Fever for the purposes of the said Ordinance.

No. 507 of 1914.] [10th December, 1914.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard area in the native district of Melsetter :—

(a) *Area of Infection.*

The farm Nooitgedacht.

(b) *Guard Area.*

An area bounded by and including the following farms :—Joppa, Merrywater, Heathfield, Albany, Uitkyk, Knutsford, Ferncreek, Vermont, Wolfscrag, Enhock, Woodstock, Landsdown, Kennilworth, Groenvlei, Vleiplaats, Waterfall, Fortuna and Outspan.

No. 381 of 1914.] [3rd September, 1914.

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of this Notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe and Gwanda.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 527 of 1914.] [31st December, 1914.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the 1st day of January, 1915, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including the Salisbury native district bounded by and including the following farms :—Lilfordia, Saffron Walden, Kilworth, Porta, Outspan, Clements' Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Odar Outspan, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Caledonia, Hartmans, Chishawasha, Glenlorne, Borrowdale, sections 4 and 1, The Willesden, Lowdale, Ingleborough, Mguta, Great B, Umsasa, Springvale, Passaford, Spa, Fairview, Nalire, Penrose.

No. 70 of 1915.] [4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms :—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar, Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 505 of 1914.] [10th December, 1914.

CLOSING OF GATES ON ROADS, ETC.

UNDER and by virtue of the powers vested in me by section 26 of the "Fencing Ordinance, 1904," I do hereby provide that travellers passing through a gate erected on a public or private road in terms of section 25 of the said Ordinance, and omitting to close such gate after having passed through, shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examina-

tion or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address..
2. Number and Class of Cattle to be imported...
3. Area or Farm and District where Cattle are at present located..............
....
4. Area or Farm and District to which Cattle are to be moved.................
....

Applicant's Signature..

Date..................................

Application..........................

Permit No...........................

ANNEXURE "B."

I, ... residing on the farm .... in the district of .... do solemnly and sincerely declare that the .... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals .... Bulls .... Heifers ....

Breed ....

Seller's Name and Address ....

....

Purchaser's Name ....

Place in Southern Rhodesia to which animals are being sent

....

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at .... on this .... day of................ before me,

....

Resident Magistrate for the District of ....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London

Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, ETC.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries :—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals, nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date................................., 19...
Place...

....
Signature of
Government Veterinary Surgeon.

Number and general description of animals:
...............Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent:
....

Owner's name and address:
....
....

Place in Southern Rhodesia to which it is desired to send the animals
....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south. and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at .... in the district of... .... in the............................ Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to..................................† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at..on this.............. day of..before me.

....
Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent..............................

Owner's name and address...

....

Place in Southern Rhodesia to which animals are being sent......................

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.
Gwanda.
Plumtree.
Fort Rixon.
Belingwe.
Inyati.
Fort Usher.
Mphoeng's.
Holi.
Filabusi.
Gwaai.
Figtree.
Umvuma.
Que Que.

No. 375 of 1912.] [28th November, 1912.

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches; and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :
Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :
Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Open areas.

The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following areas in the Hartley district and the Sebungwe district until further notice.

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

Sebungwe District.—From the confluence of the Sengwe and Lutope Rivers up the Lutope to its headwaters, thence in a south-east and easterly direction following the southern edge of the escarpment, leaving Meare's farm to the south, to the Mafungabusi Peak, thence northwards along the escarpment to the Njelele River, and down that river to its confluence with the Sanyati River, thence northwards down the Sanyati River to its confluence with the Piriwiri River, thence direct in a north-westerly direction to Picaninyemba, and thence along the footpath to Nenyunka on the Sengwe River, thence southerly up the Sengwe River to its confluence with the Lutope.

Elephants, Hartley District.—Notice No. 168 of 1914 permits the shooting or capturing of elephants on or within five miles of the farm Walden, in the Hartley District, for a period of one year from 9th April, 1914.

The game specified may be shot in these open areas without a licence.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

No. 390 of 1912.] [19th December, 1912.

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds :—

(1) Great Locust Bird or White Stork (*Ciconia alba*);
(2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*);
(3) Small White Heron or Cattle Egret (*Bubulcus ibis*);
(4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 38 of 1915.] [28th January, 1915.

ESTABLISHMENT OF POUND ON IRVING FARM, IRON MINE HILL.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that at the request of the Civil Commissioner, Gwelo, a Pound has been established on Irving Farm, Iron Mine Hill, in the magisterial district of Gwelo, and that the said Pound will be available for public use from the 1st February, 1915.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

- Biscuits
- Bread
- Butter
- Confectionery
- Cigarettes
- Dried & Bottled Fruits
- Dried Meats
- Eggs
- Flour
- Flowers
- Honey
- Jam
- Plants
- Poultry
- Seeds
- Sugar
- Tobacco
- Wool Samples

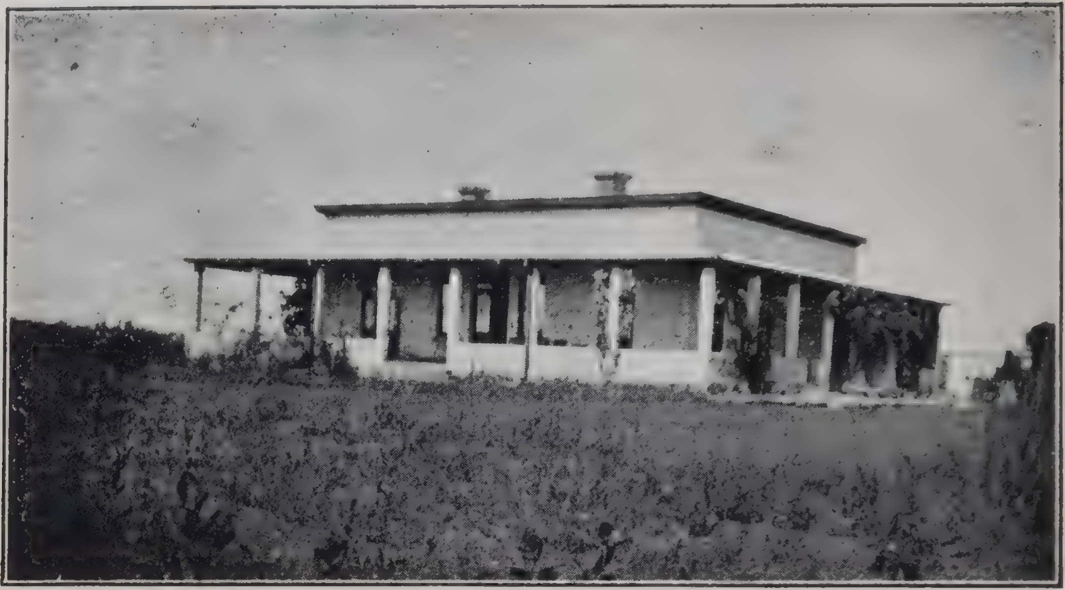
and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

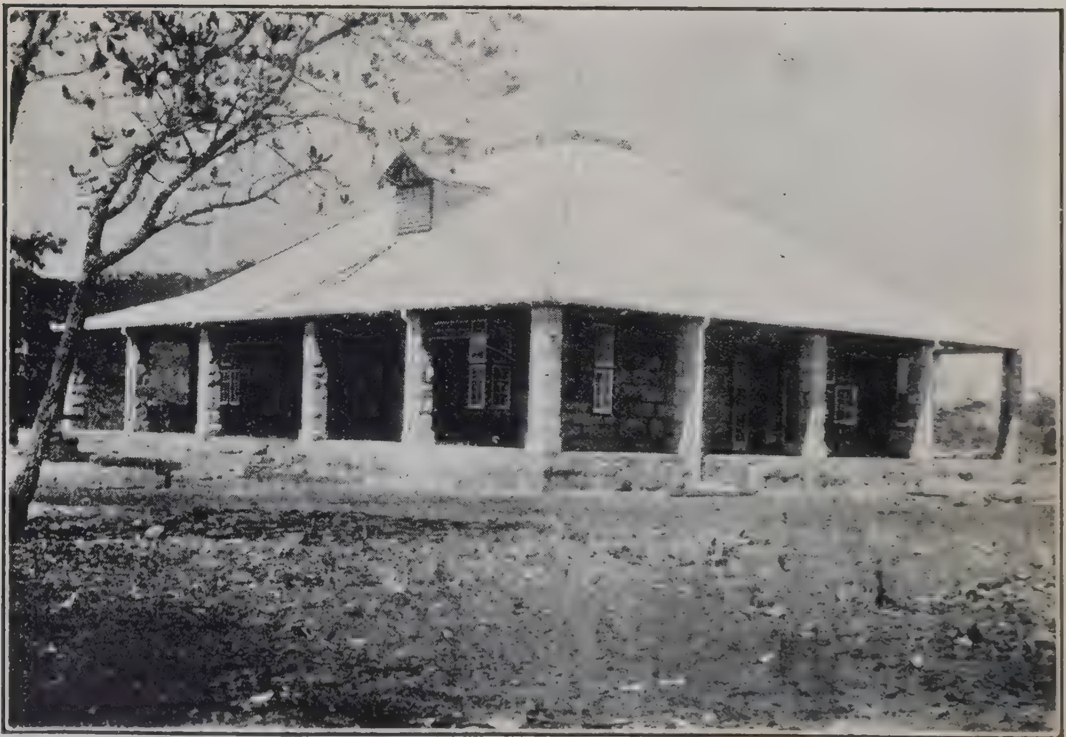
The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.



Homestead at Ballineety Farm, near Salisbury, the property of Mr. L. Glanfield.



(Architect, Mr. W. D'Arcy Cathcart, A.R.I.B.A.)
Homestead at Borderland Farm, Goromonzi, the property of Mr. J. G. M. Bernard.

Types of Farm-houses in Rhodesia.

THE RHODESIA

Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

PUBLISHED BI-MONTHLY.

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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

GWELO BUTTER.—We are pleased to observe that butter made at the Gwelo factory gained two bronze medals at the Johannesburg show. One was for the best box of bulk butter, and the other was for the best box of butter in pound pats. Considering the handicap under which the butter suffered, owing to the distance it had to be transported, and the fact that the exhibits were about twice the age of those sent by creameries in the south, the successes gained are highly commendable and augur well for the future of this country from a dairying point of view.

RHODESIA AGRICULTURAL UNION CONGRESS, 1915.—The Rhodesia Agricultural Union Congress was held at Salisbury on the 21st, 22nd and 23rd April. Some seventy delegates, representing thirty farmers' associations, attended, and Mr. E. Wilson presided. At one time there was some doubt as to whether the Congress would be held this year, but we are glad it was found possible to meet as usual, for a full and free discussion, by those principally concerned, of the various questions affecting the farming industry must tend to the common good. A comprehensive agenda, consisting of thirty-seven items, together with a supplementary agenda, which included forty-one subjects, came before the Congress, and, thanks to the able chairmanship of the President, it was found possible to deal with all in the period allotted. The Congress was opened by the Administrator, and this being the first occasion the farmers had met His Honour, the President, on behalf of the delegates, extended him a cordial welcome. The agenda included several subjects of a very contentious nature, but we were glad to see that all were discussed in a spirit of moderation, and an honest endeavour made to arrive at a reasonable solution of any difficulty arising. We are pleased to see that the number of associations affiliated to the Union is now forty-three, representing some 1,200 farmers of the Territory.

The Union is without doubt a power in the land, and at the conclusion of this the twelfth Congress that has been held, we tender our best wishes for a continuance of the good work that has been done in the past.

AGRICULTURAL CO-OPERATION.—The last subject discussed at the Agricultural Congress was agricultural co-operation, and although it was not included in the agenda, it was by no means the least important that came before the delegates.

The subject was brought up by Mr. P. H. Gresson, who based his resolution on the suggestions made by Mr. E. Wilson in an article written by him for the April, 1915, number of the *Agricultural Journal*. Mr. Wilson's suggestions were, briefly: (1) the appointment by the Agricultural Union of an expert to give advice regarding the formation and working of co-operative societies in Southern Rhodesia; (2) the formation of the various farmers' associations into co-operative societies; (3) the establishment of one or two central agencies as joint stock companies for the purpose of selling the produce of the associations which would be affiliated to these agencies and the purchase of their requirements. The principles contained in the suggestions in question were unanimously approved by the delegates, and the only dubiety that was expressed as to the feasibility of the scheme was as to whether the finances of the Union could stand the expense involved. After some discussion the executive of the Union were requested to formulate the scheme as outlined, and submit their proposals to the various affiliated associations for their consideration.

Mr. Wilson is, without doubt, the greatest authority we have on co-operation in Rhodesia, and those who have read his article must have realised the close attention he has given to the subject. Conditions here, of course, are vastly different to those obtaining in those older countries where co-operation has been brought to such a high level, but we are of opinion that the proposals made by Mr. Wilson are workable, and with good management can be adopted to the mutual benefit of all connected with the farming industry in this country.

AGRICULTURAL STATISTICS.—It was with much pleasure that we noted the appreciative reference made by the President of the Agricultural Union at the recent Congress to the result of the first attempt to secure agricultural statistics in this Territory. The prompt publication of the figures has given general satisfaction, and we sincerely trust that farmers and others called upon to render returns will give the same ready attention to the requests of the Statistical Officer in future as they have on this initial occasion. That the usefulness of these statistics is recognised by the farming community is evidenced by the resolution passed at the Congress, to the effect that the returns be extended to include monkey nuts and oil seeds, citrus and deciduous fruits, and all cereals, as well as the mortality amongst stock. This is a very comprehensive list, but it is doubtful whether there is much object, at the present stage of our development, in obtaining totals of all the deciduous trees in the country, or particulars in regard to each variety of cereal grown.

The present list can, however, be usefully extended, and it is probable that returns will next be asked for, in addition to existing items, in regard to kaffir corn, citrus fruits, potatoes, wheat, monkey nuts, mortality amongst horned cattle, and the extent of irrigated land. Although the last named item is not included in the list mentioned in the resolution passed at the Congress, it is one of considerable importance, and the information will be of general interest.

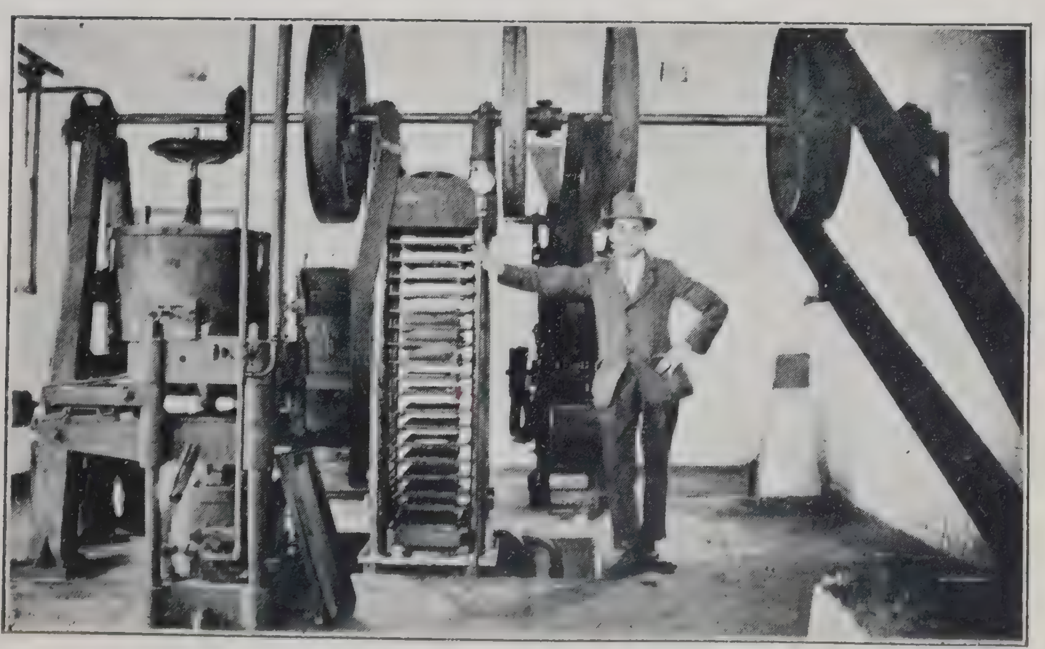
THE OIL FACTORY.—The Oil Factory has commenced operations, and farmers and those interested now have the opportunity of inspecting this latest addition to our growing list of local industries. The process of extracting the oil is quite a simple one, but at the same time it is very interesting. At the time of our visit only ground nuts were being crushed, but, as stated in the last issue of the *Journal*, castor beans, sunflower seed, linseed and cotton seed are also dealt with. A fair quantity of ground nuts had been received, and we were shewn several bottles of salad oil, to which purpose, if a sale can be found, the oil will be partly put. We were also shewn samples of the feeding cake into which the residue of the ground nuts is made, and this will be sold at £10 per ton. Ground nut cake has a high feeding value, and we foresee a ready sale for this local product.

There is a plant at the factory for manufacturing soap, for which purpose the ground nut oil will be largely used. For a start, only household soap will be made, but it is hoped later to also manufacture toilet soap. The scope there is in this direction will be realised by an examination of the Customs returns, which shew that soap to the value of £24,550 was imported into this Territory during 1914.

Castor beans will be husked at the factory, but they have to be shelled before being accepted. Castor oil is mainly used for lubricating purposes, and a sale will probably be found with the various railway systems.

The creation of this new industry is another step forward in our industrial development, and we trust the same measure of success that has marked the establishment of the Creamery at Gwelo and the Bacon Factory at Salisbury will attend the operations of the Oil Factory.

Sixty-five acres of castor beans at Mr. C. J. S. Hopgood's farm, Eyam, Hartley district.



Interior of Oil Factory, Salisbury.

Co-operation at Marandellas.—We welcome the formation of a farmers' co-operative society at Marandellas, which came into being on the 10th April last, as a result of the adoption by a largely attended meeting of the report and rules and regulations submitted to it by a committee that had been previously appointed. The rules are mainly based on the Co-operative Agricultural Societies Ordinance of 1909, and every member binds himself to dispose of the whole of his farm produce and stock through the society, excepting such as he requires for his own farming or domestic purposes. This does not apply to maize, cream or tobacco, or to any produce which a member may desire to be forwarded in fulfilment of an existing contract. Members are also at liberty to barter produce, farm implements or stock with natives or with other members of the society for other produce or stock, or in return for labour. Payment to members for produce sold is to be made monthly, and as soon as the society is financially in a position to do so, advances will be made in respect of produce or crops other than perishables as soon as delivery is made to the society. The purchase of farming requisites, such as fertilisers, implements, etc., will be undertaken by the society, and the individual should thereby effect a considerable saving.

There is, as described in the last issue of this *Journal*, a co-operative transport scheme in operation for the marketing of light produce, and this will no doubt be of considerable assistance to the larger undertaking. The directorate is as follows:—Messrs. J. H. Finch, N. C. Wright, C. Willmot, — Seager, J. Tanner and E. P. de Kock.

The society is to start business at as early a date as possible, and we wish it the best of success in its operations.

The Citrus Industry.—In this issue we publish the last of the series of articles Mr. A. G. Turner has been writing regarding the various operations connected with the growing of citrus fruits. The whole series will be made into one bulletin, which will be available for distribution shortly after this *Journal* appears. The bulletin will be issued free of charge, and applications for copies should be made to the Director of Agriculture, Salisbury.

SELECTION OF SEED MAIZE.—Now that the maize harvesting season is upon us, the careful selection of seed maize should receive the earnest attention of every farmer. If possible, standard cobs of Salisbury White and Hickory King maize should be obtained for the purpose of selection, but these are not always easily obtainable, and the Department of Agriculture is issuing almost life size photographs of standard ears of these varieties, which will be of material assistance in producing uniform seed maize throughout the country. These photographs may be obtained upon application to the Government Agriculturist and Botanist at a price of 1s.

DIPPING TANKS FOR CATTLE.—The capacities given in the schedule on page 204 of the December, 1913, issue of the *Journal*, and on page 10 of Bulletin No. 167, have upon further calculation been found to be too low. The following figures give the capacities more accurately:—

Depth.			Depth.		
Ft.	Ins.	Gallons.	Ft.	Ins.	Gallons.
0	0	0	4	0¾	1,600
0	4¾	100	4	2¾	1,700
0	9	200	4	4¾	1,800
1	0¾	300	4	6½	1,900
1	4½	400	4	8¼	2,000
1	8	500	4	10	2,100
1	11½	600	4	11½	2,200
2	2½	700	5	1	2,300
2	5½	800	5	2½	2,400
2	8½	900	5	4	2,500
2	11¼	1,000	5	5½	2,600
3	1¾	1,100	5	7	2,700
3	4	1,200	5	8½	2,800
3	6¼	1,300	5	10	2,900
3	8½	1,400	5	11½	3,000
3	10¾	1,500	6	0	3,060

AGRICULTURAL SHOWS.—Despite the abnormal times, agricultural shows will be held much the same as usual this season. We understand that the Gwelo Show is cancelled, but the three other principal shows of the Territory, viz., Bulawayo, Umtali and Salisbury, are to take place as usual. By the time these notes appear, the Bulawayo Show will have been held, and the dates of the Umtali and Salisbury Shows are 24th—25th June, and 15th—16th July, respectively. In addition, a show will probably be held at Glendale, and the date tentatively fixed upon is the 8th July.

Crops Estimate.—The following table gives the estimated yield from the current season's crops of maize and tobacco grown by European farmers; natives' crops being left out of account altogether.

Native Districts.	Maize.		Tobacco.	
	Acres.	Estimated yield, bags of 203 lbs.	Acres.	Estimated yield, lbs.
Mashonaland—				
Salisbury	37,412	251,351	278	152,500
Hartley	20,839	83,916	232	102,250
Lomagundi	11,363	57,233	74	35,100
Mazoe	40,347	347,504	42	14,000
Marandellas	6,323	24,388	561	193,800
Darwin, Mrewa, Mtoko ...	1,572	7,816	177	60,000
Umtali	4,587	30,492	—	—
Inyanga	261	1,073	1	500
Makoni	6,074	27,983	110	45,800
Melsetter	1,929	9,950	24	12,170
Charter	4,379	8,415	3	1,100
Chilimanzi	2,618	7,615	6	4,125
Victoria	2,681	11,041	—	—
Gutu, Ndanga, Chibi ...	1,502	4,865	—	—
Totals for Mashonaland ...	141,887	873,642	1,508	621,345
Matabeleland—				
Bulawayo	2,132	5,850	—	—
Insiza	5,291	14,580	—	—
Umzingwane... ...	4,353	8,651	—	—
Matobo	1,890	4,441	—	—
Bulalima-Mangwe ...	6,155	9,543	—	—
Nyamandhlovu ...	2,968	7,810	—	—
Bubi	2,981	13,788	—	—
Wankie, Sebungwe ...	1,215	4,620	3	1,200
Gwelo	10,611	29,521	45	21,230
Selukwe	6,549	29,094	—	—
Gwanda	1,619	3,264	—	—
Belingwe	802	1,820	—	—
Totals for Matabeleland ...	46,566	132,982	48	22,430
Grand totals for S. Rhodesia	188,453	1,006,624	1,556	643,775

Estimated surplus of Maize available for export, 510,000 bags.

As regards tobacco, it will be seen at once that there has been an enormous falling off both in the acreage planted and in the anticipated crop, as compared with last season, and there can be no doubt that this is due to the vast majority of individual tobacco-planters having reverted to maize-growing, for this season, at any rate. It is interesting to note that in the Marandellas district, for instance, the decrease in the area under tobacco is almost exactly counterbalanced by the increased acreage under maize.

The maize crop, as was anticipated, shews a very great and satisfactory increase, and is estimated to yield not less than 1,006,624 bags, each of 203 lbs., for the whole of Southern Rhodesia; the figures for Mashonaland being 873,642 and for Matabeleland 132,982 bags; while in the latter case there are some thousands of acres from which the yield, though lost as grain, will be turned to profitable account in the form of ensilage.

The excessive rains in the early spring played havoc with the farmers in Matabeleland and in some districts of Mashonaland, especially coming, as they did, after several seasons of absolute drought during which the natural tendency had been to desert the higher lands for the lower vlei soil. The consequence was that, in almost every instance, the whole of the ground intended for cultivation was reduced to a quagmire which was utterly inaccessible to the plough: or, where this operation had been effected, to the weeder and cultivator. Consequently the acreage reaped, especially in Matabeleland, is considerably less than was actually sown in the first instance.

To some extent the situation was saved by the later rains towards the end of March and early in April, which made all the difference to crops of a late or second sowing; though the abnormally cold snap in the middle of May, when the thermometer on several occasions registered a temperature well below freezing point in Salisbury, gave rise to some anxiety.

Mazoe comes easily first in the returns, both in the gross, 347,504 bags, and in the average yield per acre, 8·6 bags: while Salisbury comes next with 251,351 bags, or 6·7 to the acre. Then, with a drop to only just over 4 bags an acre, Hartley shews an estimated yield of 83,916 bags; Lomagundi and Umtali, 57,233 and 30,492, returning just over 5 and 6·6 bags to the acre respectively.

The quantity that will be available for export is estimated at just 10,000 over the half-million bags; but the amount that will eventually and actually be sent oversea is largely dependent upon factors that are entirely outside the Department's cognisance or control, such as the arrangements that can be made in regard to ship-accommodation and freights.

Citrus Fruits in Rhodesia.

(*Continued.*)

By A. G. Turner, Government Citrus Adviser.

IRRIGATION.

The necessity for irrigation in commercial citrus groves has already been referred to by the writer in the December, 1914, issue of this *Journal*, but no excuse need be offered for repeating that no citrus orchard should be laid out in Rhodesia without there being facilities for irrigation, especially in view of the fact that many planters and intending planters in this Territory are under the impression that irrigation for citrus orchards is not essential.

Having shewn in the article referred to above (December, 1914) that the application of artificial water is a necessity, it might be advisable to give some idea of when to apply it, and some methods as to how it is done.

Briefly, an orange tree should never be allowed to shew any signs of distress from want of moisture, such as curling up of leaves or wilting. Now, this may occur at any time of the year, even during summer in abnormal seasons, so that it is not possible to state any exact period when water should be applied, as the character of the soil, temperature, and many other conditions vary so extensively. For the same reasons, broad statements of the amount of water required can merely be suggestive, and are not to be followed as rules.

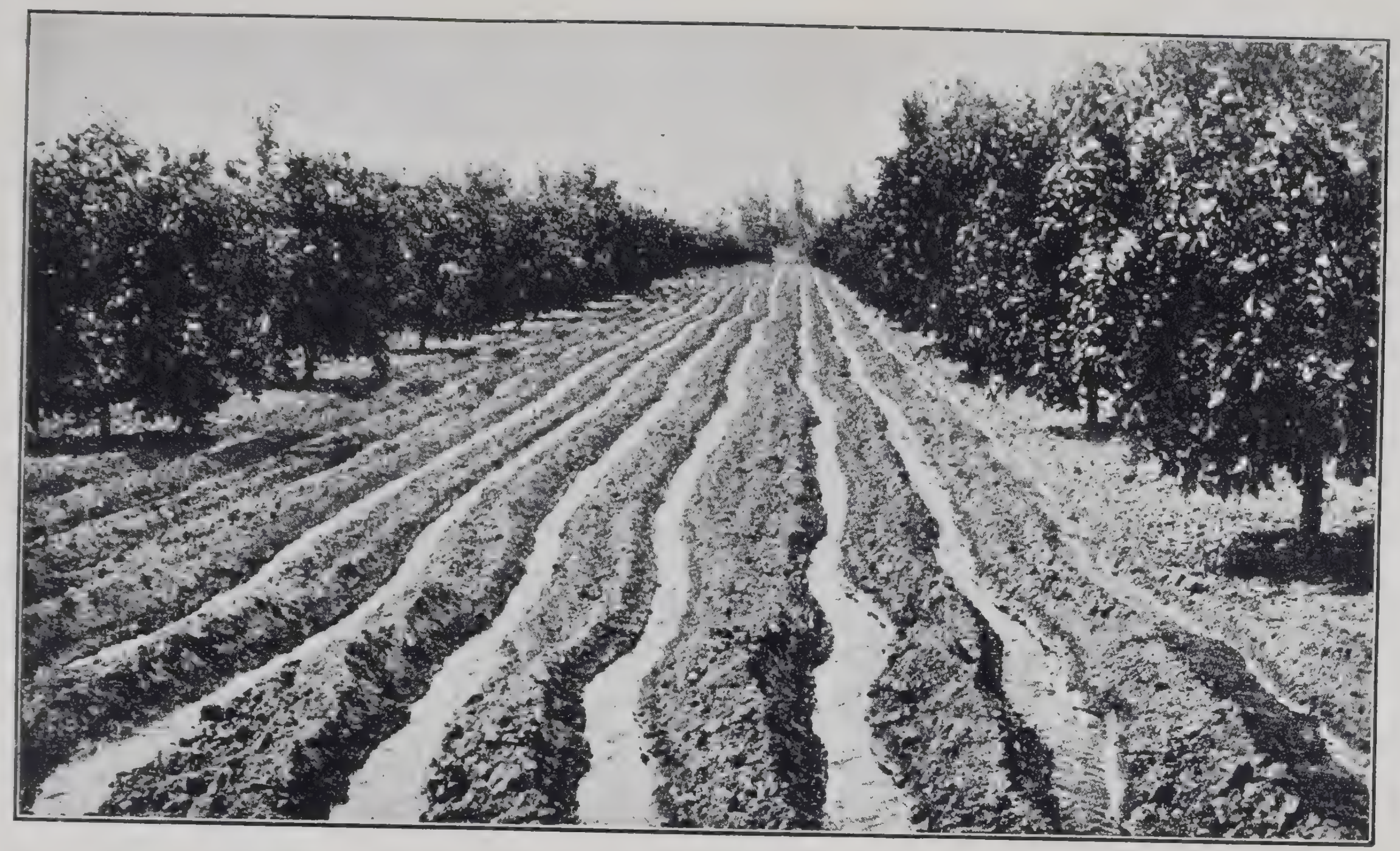
The trees require water at the time of blooming and after, in order to enable them to set and hold a full crop of fruit; further, as an orange takes about nine months to mature, it is necessary to be able to apply water at intervals during the whole of this period up to within two or three weeks of picking the fruit. During the months of July, August, September and October, when sunlight is practically continuous and growing hotter each day, and consequently evaporation is at its greatest, a most important period in the annual life of an orange tree is passing, so that there is the greatest need for the provision of water during these four months.

Roughly speaking, the irrigation of orange trees should commence before blooming and be repeated every month to six weeks until the rains arrive; also during summer if the rainfall is insufficient to keep the trees and crop in good growing order. Whatever the system of irrigation used, the water should soak deeply into the ground.

The benefits resulting from irrigation may be said to be due to the ability to apply water at the right time and in sufficient quantities, so that the regularity of the crop is ensured. There is, in many soils in Southern Rhodesia, perhaps sufficient moisture conserved from the previous wet season to enable the trees to bloom profusely, but not to give them enough vitality to set the fruit and carry it on to maturity. This is a point that many planters in Rhodesia seem to lose sight of, but I would assure them that it is this particular point that makes all the difference between a prosperous orchard and a failure.

The amount of water required to irrigate an acre of orange trees can be roughly estimated as a quantity equalling 75,000 gallons per acre per application. This is on the basis of delivering the water in pipes, flumes or earth ditches to the immediate vicinity of the trees to be irrigated, but as remarked above, such figures can only be accepted as approximate.

The method of applying water is governed to a great extent by the amount available. In orchards that have been properly laid out, the best way is by running water in furrows, six of these, say, being ploughed between each row of trees, about 3 feet apart, and none closer than 4 feet; this distance from the trees applies to large bearing trees, and can be taken closer for young trees, say, 2 feet. Before the trees reach bearing age, it is possible to supply sufficient water in a modified manner, namely, by drawing a furrow from 2 to 4 feet, according to age, on every side of each row of trees. This scheme can be increased as the trees get older, by drawing two



No. 1, Furrow System. A small stream is allowed to run down the furrows constantly for three days, permeating the soil throughout without washing away the elements of plant food. From Professor Wickson's "California Fruits."

or more furrows on each side of every row, say, 6 feet apart. By these means a succession of dams can be obtained, practically covering the whole area of ground. The check system of irrigation can be utilised with a small flow of water as compared with the furrow method, but it is not to be recommended for bearing trees, where the former method can be operated satisfactorily.

I will endeavour to describe only these two methods of irrigation:—No. 1 by furrows, No. 2 by modified form of checks, although there are numerous other methods in use. (See photo and sketch.)

No. 1.—To lay out the orchard for this method of irrigation, plough six deep furrows about 3 feet apart between each row of trees, but none closer than 4 feet to the trees, taking the furrows upon the lowest possible gradient to avoid erosion.

This operation can be performed by an ordinary riding cultivator with 3-furrower attachments. The work is done more quickly by this method, but it has the disadvantage of not going so deep as the plough.

When the whole block to be irrigated has been thus laid out in furrows, the water is applied slowly, but so that the water is constantly running over the entire length of each individual furrow without causing any undue washing and a minimum wastage of water. Three days are spent in watering a block. With a view to facilitating both irrigating and cultural operations, orange trees should not be planted in blocks of more than 10 to 20 acres.

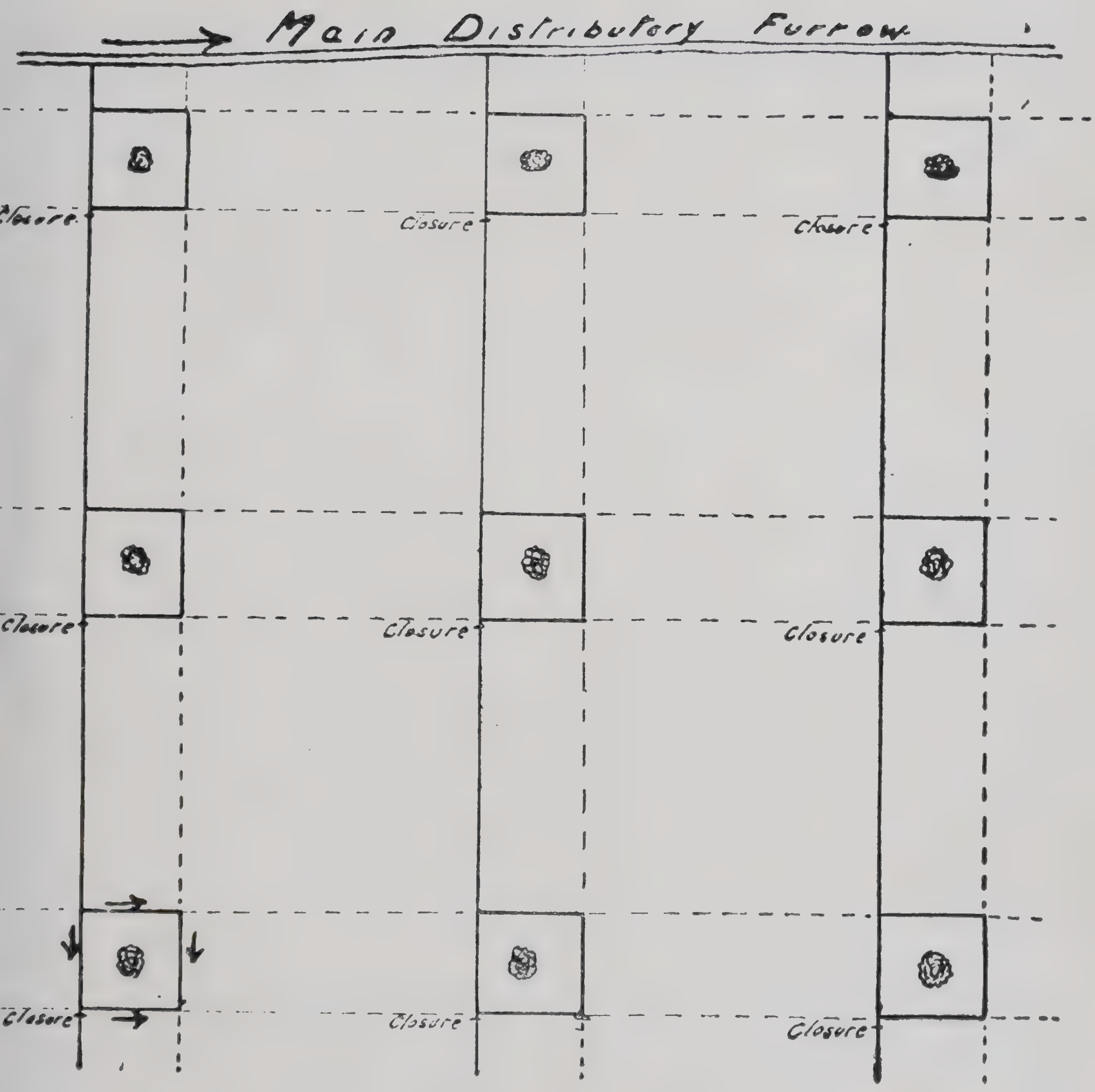
To get the orchard ready for No. 2 system, it is advisable to use a ditching plough with wings on the mould-board, but the plough that is commonly used in this Territory for hilling up mealies would serve the purpose equally well. Draw furrows down every side of each row of trees, and if the plough suggested is properly set, a furrow about 2 feet broad will be obtained. Where the slope of the ground is so great as to render the soil liable to be washed away, alignment of the furrows should be laid out diagonally. At the intersection of each furrow the earth must be thrown up with a spade, and by these means four dams are constructed, with a minimum of labour, around each tree. All furrows and dams must stand well away from the base of the trees, but covering the space where the roots should be. For older trees, duplicate the whole operations, which will practically give a succession of dams over the whole area.

The water can be applied row by row, or the whole block can be covered at one time, according to the amount of water available, the water being led to the lowest point on the slope of the land first, and so filling up each succession of dams as it is applied, by working up the rows.

By this method it is not possible to get sufficient water into the ground by one filling of the dams, so that it is necessary to repeat the dose two or three times until the ground is well saturated. An irrigation half performed is almost worse than none at all, as it is inclined to induce root growth too near the surface, whereas it should be the aim to induce the roots to work well down, as in the event of a drought or anything going amiss with the irrigation supply, shallow-rooted trees will suffer most.

Whatever system of irrigation is used, cultivation must follow as soon as the ground has sufficiently dried out to allow of animals working on it.

It might be advisable to suggest a few ways how not to irrigate. One good way of inducing collar rot is to make basins about the stems of the trees and fill these with water: this method also cramps the root system instead of inducing them to feed far away from the trees, as they should do. Another method not to be recommended is one that was commonly used in the Transvaal some years ago, viz., to lead the water down a furrow or furrows on either side of the trees every few days, and when the water reached the bottom of the furrow to cut it off and leave the furrow open. When water was applied the next time it was led into the same furrow, and the same practice continued right through the winter. This method is wasteful of time and water, as the greater quantity of water is evaporated; and, moreover, if the water supply for any reason is not available the trees will consequently suffer much sooner than would be the case if water were intelligently applied.



No. 2 System. The full and dotted lines represent the lines of furrows as ploughed; the full lines represent the lines of furrows actually utilised.

CULTIVATION.

Cultivation is beneficial and necessary in many ways to the general health of an orchard. It pulverises the earth and allows aeration of the soil and roots of the trees, which can then penetrate to all parts of the soil. The water-retaining capacity of the soil is also increased, and the rain more readily penetrates to the deeper layers, while evaporation is checked by a fine top soil of mulch produced by good cultivation.

In Rhodesia we must always be prepared for a possible shortage of rain, and the certainty of a period of five or six months when no appreciable rainfall can be expected, and we must adapt our system of cultivation accordingly.

Before the wet season arrives the whole orchard should be thoroughly ploughed and cross ploughed, so as to be in a condition to receive the greatest possible amount of the rain that may fall. When the ploughing is finished, it is a good plan to sow some cover crop, such as kaffir beans or other legume, thickly (about 75 lbs. per acre) over the whole area between the trees, and this should be turned into the land towards the end of the wet season. This not only provides humus and nitrogen, but assists in preventing the washing away of the soil during the heavy rains.

After the beans or whatever other soiling crops have been sown, the land must, of course, be well harrowed. While on this point, I would remark that to avoid erosion of the soil as much as possible where the orchard stands on a hillside, the first ploughing should be done *up and down* the hill, and the cross ploughing *across* the hill; and further, whether a cover crop is sown or not, after harrowing the land, a good deep furrow should be ploughed along the centre of each or every other row of trees, according to the steepness of slope, *across* the hill, assuming that the necessary storm-water furrow has been constructed above the whole area. This will help to carry off the surplus rain that actually falls on the orchard during heavy thunderstorms. These furrows should be taken to the ends of each block, where a drain can be made to carry off the water to a convenient donga or some natural water course. When the rainy season is over, the orchard should, if possible, be cultivated about every ten days or two weeks, so as to conserve as much moisture as possible. The trees should also be frequently dug or forked round to prevent the ground from packing.

For ploughing or cultivating operations in an orchard, horses, mules or donkeys should be used; the latter are certainly very slow, but, if possible, oxen should not be utilised, as, no matter how careful the driver may be, they will do considerable damage. In any case, if they must be used for want of other tractive power, try and plough one or two furrows near the trees with an old mule, or any beast except an ox, hitched on to a small plough, and plough only the centres with oxen.

In ploughing an orchard, care should be taken to perform the operation evenly, that is to say, if the soil is taken away from the trees at the first ploughing, the cross ploughing should be done so as to throw the ground towards them, and when the next ploughing takes place the operation should be reversed. By these means the surface of the orchard can be kept as level as is possible, which will facilitate irrigation and cultivation. Also, ploughing continually at the same depth should be avoided, as it tends to form a hard pan through which neither rain nor artificial water can penetrate. Therefore, set the plough at varying depths at different ploughings, from 6 to 10 inches. The same remarks apply to cultivation.

Whatever happens, weeds should not be allowed to grow in a citrus orchard, or any other orchard for that matter, as they rob the trees of moisture, and, moreover, tend to harbour pests of various sorts. The sowing of a cover crop is a different matter; it is there for the special purposes of holding the ground and supplying humus and other fertilising matter which considerably reduce the fertiliser bill.

FERTILISATION.

In the manuring of fruit trees, the first object is to produce thrifty trees, as subsequent fertilising for fruit will not give satisfactory results with poorly grown and partially developed trees.

In order to promote growth, a liberal supply of a complete fertiliser should be used, and the soil kept in the best mechanical condition. When the orchard is in full bearing, there is a heavy draft upon the soil, and to meet this fertilisers should be used liberally. The productive period of an orchard is materially lengthened by the judicious use of fertilisers.

The following analysis shews what ingredients it is necessary to return to the soil for every 1,000 lbs. of oranges grown, without reference to any requirements of the soil:—

Quantities of Soil Ingredients withdrawn by Various Fruits.

Compiled from analysis by G. E. Colby, University of California.

Fresh Fruit. 1,000 lbs.	Total Ash. lbs.	Potash. lbs.	Nitrogen. lbs.	Lime. lbs.	Phosphoric Acid. lbs.
Oranges	4.32	2.11	1.83	.97	.53

It is to be regretted that no local data in regard to the most suitable fertiliser dressing for citrus trees have so far been obtained; consequently, for the present, we must depend upon our general knowledge of the soil's manurial requirements and the experience gained in the manuring of citrus trees in other parts of the world. On these grounds, the following formulæ for manurial dressings, prepared by Mr. G. N. Blackshaw, Government Agricultural Chemist, are recommended where commercial fertilisers are required, due regard being paid to the cost in fixing the rate of application, also to the fertility of the soil, size and age of the trees:—

Fertilisers for Citrus Trees.

(A) For young trees—

	lbs.
Sterilised bone dust (containing $3\frac{1}{2}$ per cent. nitrogen and 20 per cent. phosphoric oxide)	500
Double superphosphate	80
Sulphate of potash	300
	880

Apply the above mixture at the rate of 3 lbs. per young tree—cost of dressing about $4\frac{3}{4}$d. per tree. Assume 75 trees per acre—cost per acre, 30s. 6d.

(B) For trees in full bearing—a light dressing—

	lbs.
Double superphosphate	150
Dried blood	150
Sulphate of potash	100
	400

Apply the above mixture at the rate of 4 lbs. per tree—cost of dressing about 7¼d. per tree. Assume 75 trees per acre—cost per acre, 45s. 3d.

(C) For trees in full bearing—a heavier dressing—

	lbs.
Double superphosphate	250
Dried blood	200
Sulphate of potash	150
	600

Apply the above mixture at the rate of 6 lbs. per tree—cost of dressing about 10¾d. per tree. Assume 75 trees per acre—cost per acre, 67s. 2d.

The manuring of citrus trees with an annual dressing of fresh stable or kraal manure is not to be recommended, as being highly injurious to the quality of the fruit produced. Recent reports from Government Fruit Inspectors in the Union of South Africa go to shew that fruit arriving from districts where this class of manure is used entirely are so puffy, coarse and wanting in juice as to be practically valueless for export. In the case of older bearing trees growing on some of our heavier soils, old well-rotted kraal or stable manure might be applied with advantage.

If leguminous cover crops are used, nitrogenous fertiliser can be very considerably reduced for both young and bearing trees. It is possible in many parts of Rhodesia to still further reduce the fertiliser bill by the application of wood ashes, great quantities of which are to be seen going to waste at every mine in the country. Ashes leached by rains are hardly worth handling, so that they should be collected from heaps that have been made since the last rains and stored in a dry place for future application. Wood ashes are valuable in potash, phosphoric acid and lime, but are exceedingly variable in composition, soft-wood ashes being less valuable than hardwood ashes. Apply at the rate of 50 to 75 bushels of wood ashes per acre, according to age of trees and composition of ashes.

If the above suggestions regarding cover-cropping with nodule-bearing legumes and applications of unleached wood ashes are carried out, I am of opinion that in most Rhodesian citrus groves little expense need be incurred for the present in the way of commercial fertilisers.

The best period of the year to apply manures is just before the early spring rains; if applied during the later rains in summer, the trees are liable to continue growing too late in the season, and consequently this late sappy growth may get nipped by early frosts. In the event of no early rains occurring, irrigation should be resorted to, in order that assimilation with the soil may take place as quickly as possible.

Fertilisers to young trees are best applied by scattering the material by hand from a radius of about 18 inches to 2 feet from the stem of the tree, to about 18 inches to 2 feet outside the spread of the branches, and then digging it under. With older trees, whose roots should be further extended and even cover the whole area of land between the rows of trees, the fertiliser should be applied broadcast by hand, or by the use of a "spreader," and then incorporated with the soil, as soon as possible, by ploughing or cultivating.

It is best that no fertiliser be applied to older trees closer than 2 to 3 feet, as injury may result to the crown roots.

PRUNING.

While the orange tree requires less pruning, when once established, than most other fruit trees, it is very necessary to attend to it constantly in the first stages of its life in the orchard, and in this respect I would refer readers to the remarks on this subject in the last paragraph of my article in the February, 1914, issue of this *Journal.*

The accompanying photographs illustrate this point fairly well. Figures 1 and 2 shew two young trees in the nursery large enough to be planted out in the orchard; figures 3 and 4 young trees after being planted in the orchard and pruned to correct height—2 feet 6 inches. With trees as shewn in figures 3 and 4, if the leaves drop on to the stems at the time of transplanting, the trunks should be protected from the sun by white-washing or by covering with newspaper or hessian. Figures 5 and 6 shew fairly well-shaped trees of three and five years old.

The best time to prune young orange trees is in June or July, and older-bearing trees after the crop has been taken off. All pruning tools should be the best obtainable, and must be kept sharp to do good work. When pruning, great care must be taken that a clean cut is made, and no stubs an inch or two long left, that is to say, make the cut right against the limb from which it is intended to remove a portion. All cuts over half an inch in diameter should be painted over immediately, to exclude air and water, and so prevent decay; any old paint will do, mixed a little thicker than for ordinary use, so that it will not run. In this respect I would warn pruners against the indiscriminate use of ready-made green paints, in which there is liable to be too much Paris Green, thereby causing burning of the bark, and possible injury to the whole tree.

All dead wood should be removed at pruning time, as should water shoots, although sometimes one can make use of some of these to take the place of broken or misplaced branches, when they should be cut back and trained in the direction required. Beyond cutting out dead wood and water shoots, a bearing orange tree that has been properly and regularly pruned from the time of planting requires very little pruning except a judicious thinning out. It should be remembered that the best fruit is often found on the inside of good orange trees, and the only way to attain this condition is to prevent the foliage getting so dense that light cannot get in. I do not wish to convey the idea that an orange tree should be opened up in the same manner as a deciduous fruit tree, as that would be fatal. An orange tree cannot stand the direct rays of the hot sun on its branches, but if the tree is kept so that one can see well into the interior from all sides and yet have plenty of shade for the tree, it will have the ideal

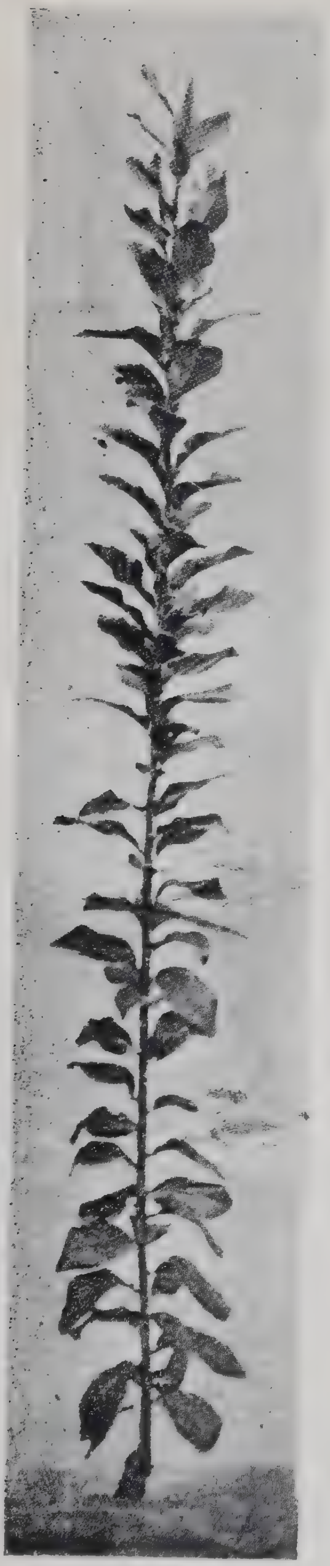


Fig. 1.

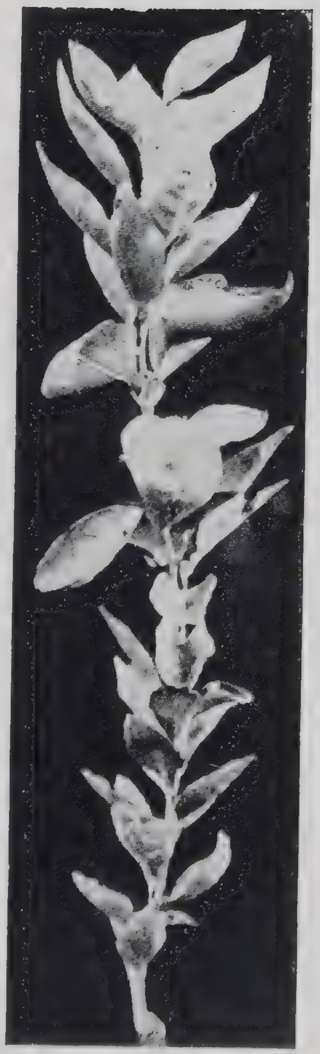


Fig. 2.

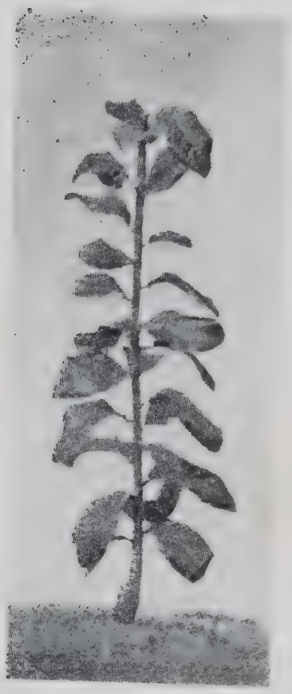


Fig. 3.

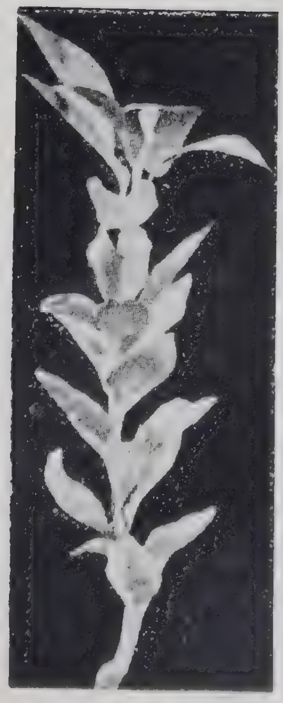


Fig. 4.

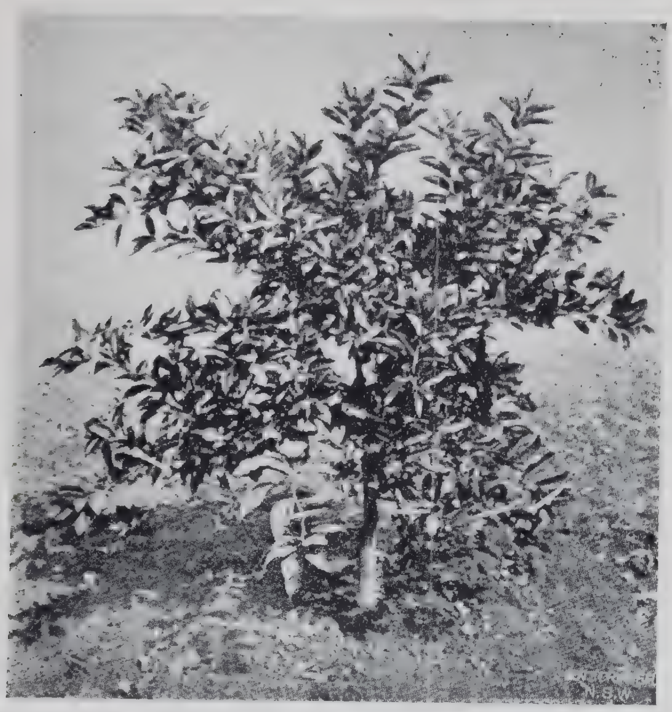


Fig. 5.

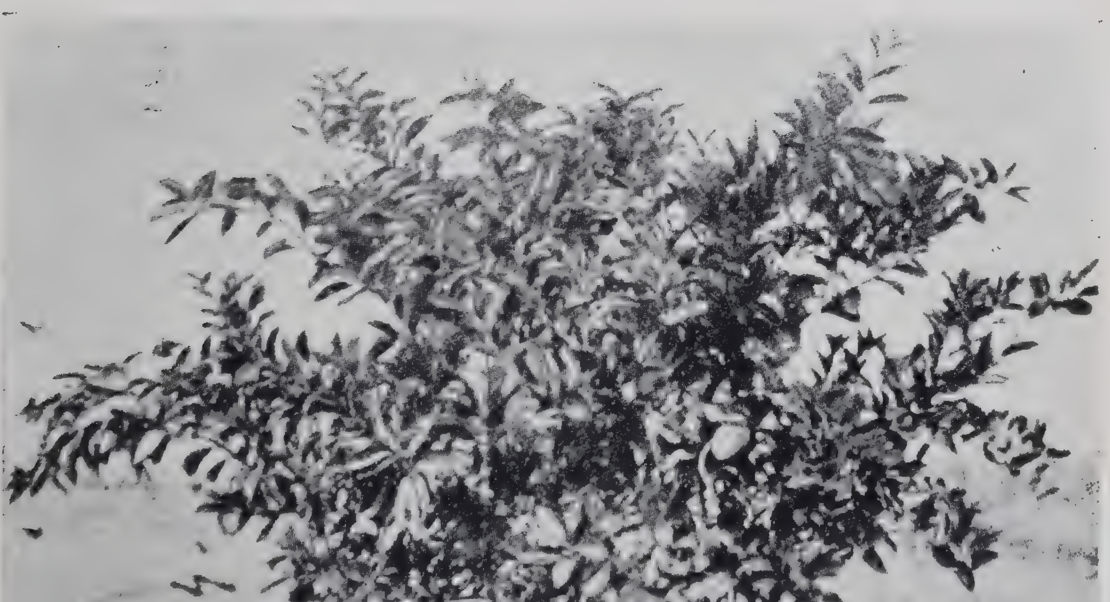


Fig. 6.

shape, and it will be possible for fruit to be borne on the inner branches; in addition to this advantage, it is possible to spray the tree satisfactorily when necessary.

Before concluding this series of articles on citrus culture in Rhodesia, it might be advisable to make a few remarks on spraying and fumigating, which are just as much a part of the curriculum of citrus growing as the other operations we have already considered.

Some growers in Rhodesia are under the impression that there are more pests to be contended with here than in other countries, but I would assure them that wherever fruit growing is carried on commercially, spraying or fumigating is reckoned with as a regular item of expense; in fact, it is taken into account as a kind of insurance. If trees are allowed to be neglected for want of cleansing of either insect pests or fungi, it stands to reason they cannot give satisfactory results.

When spraying or fumigating is undertaken in an orange grove, it should be done thoroughly and repeated at intervals, until the particular pest has been got rid of.

The Care and Feeding of Calves in Dairy and Stud Herds.

By R. C. Simmons, Chief of the Animal Industries Branch.

The dairyman in Southern Rhodesia cannot, as a rule, afford to sell his calves at a week old, since he is usually building up a herd; nor is there a regular market for such calves to persons who make a business of buying and rearing them, as in older countries. The problem, then, which has to be solved is to rear the calves, especially the heifer calves, in such a manner that they in their turn will be good and thrifty animals, while at the same time a maximum amount of milk or milk products is available for sale. Such a problem does not concern the rancher or beef producer, because his cows are allowed to nurse their own calves and are not asked to do anything else. If they fail, presumably they will be cast out of the herd. The rearing of calves is not in itself a difficult or complex task. To the man who practises cleanliness and regularity, it is a perfectly simple one. In this country, however, herein often lies the difficulty, owing to the inferior quality of the available native labour. If the native labour is not reliable, and white supervision at each meal is not possible, it is doubtful if any modern system of calf-rearing will be entirely successful.

In the title of this article the expression "dairy and stud herds" is meant to apply to those herds that are really run for dairy or stud purposes on more or less modern lines, and which are large enough and valuable enough to pay for a certain amount of constant white supervision. There are still many cows in this country which, having regard to the yet imperfect state of our agricultural development, may be regarded as good and profitable dairy cows, and yet they will not allow themselves to be milked unless the calf has first sucked. In such cases the old South African system is to allow the calf first to have a few pulls, then to milk the cow until, in the judgment of the milker, there is just enough left for the calf, and then to allow the calf to finish. The chief argument in favour of this system is that, by the use of it, many thousands of calves have been successfully reared. The more thoughtful reader, however, will admit that most of those calves have been the offspring of native or Africander types of cattle; that as a general rule only a little surplus milk has been taken, and that in such cases no attempt has been made to run anything like a regularly organised dairy business.

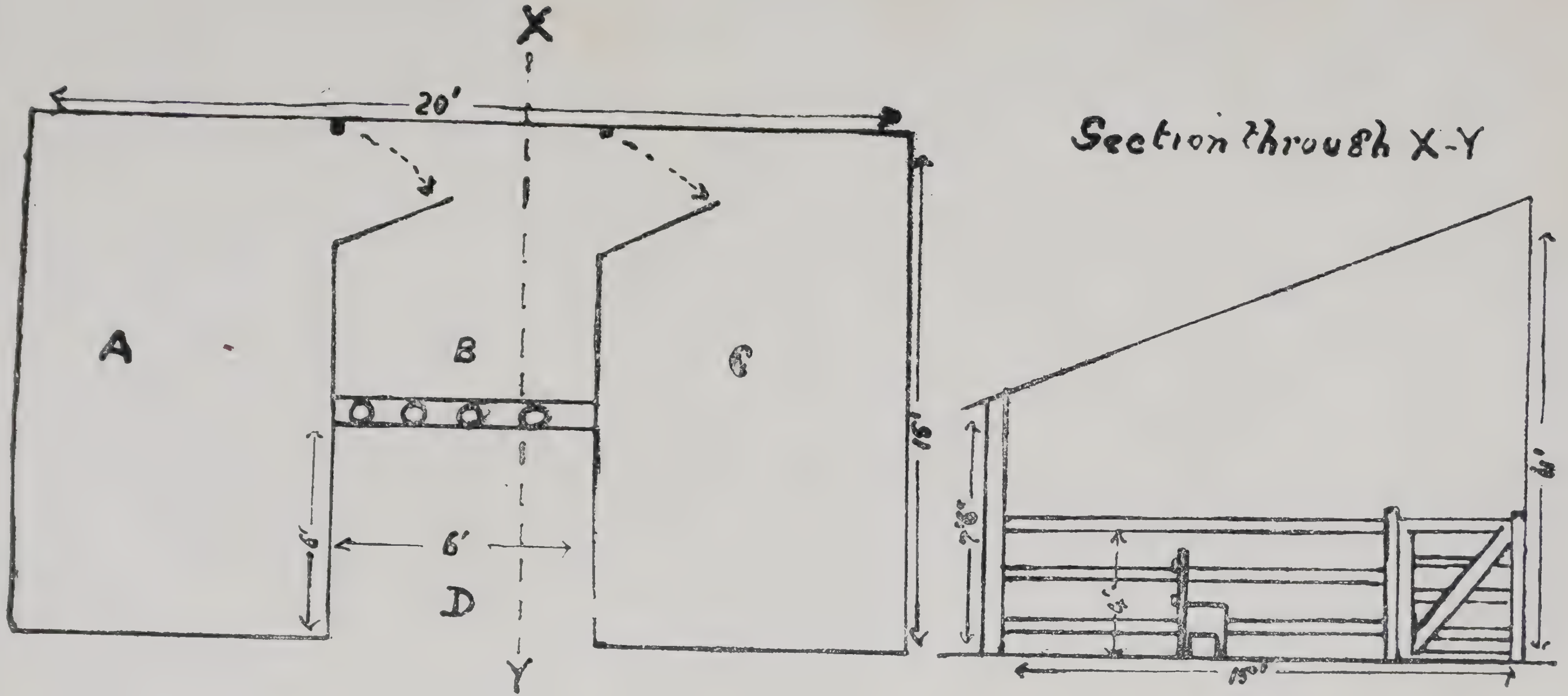
If this system is followed where the maximum amount of milk is desired, one or other of the following results is usually experienced, namely, (a) the cow is perhaps naturally a hard milker and the native milker will not take enough milk from her. In the case of cows of large yield, the calf gets too much, or it gets much one day and little the next, according as the native has been able to avoid the master's eye or not; (b) as the last milk drawn from a cow exceeds the first in fat content often by as much as 3 per cent. or 4 per cent., the owner gets the poor milk and the calf gets the bulk of the fat which, besides being detrimental to the butter and cream profits, is injurious to the calf, and liable to cause digestive trouble. The correct procedure when calves are fed entirely on the cow, is to let the calf suck first until by its appearance it is full, and then to milk what remains. Some skill and experience are required to know when the calf has had the correct amount, and to ensure that the amount does not vary appreciably at each meal. Nothing is so likely to upset a calf as to vary the quantity or quality of its milk suddenly or frequently: in fact, in the opinion of the writer, a great deal of the calf trouble which is experienced in seasons of excessive rainfall (such as the last 1914-15 season) is due to the sudden and frequent variations which occur in the quantity and quality of the milk of cows, which in their turn are caused by the frequent changes in temperature and erratic growth of the veld. The only method by which one may be certain that the calf is getting the right amount and quality of milk is to milk the cow entirely by hand and to feed the calf from a bucket.

Opinions differ as to whether the calf should be taken away from the dam at birth or left with her for two or three meals or for a week. In the experience of the writer the simplest and perhaps the best method is to leave the calf with the dam for four or five days, or until the milk of the dam becomes normal. This method ensures the calf getting the colostrum or first milk of its mother, and appears to conduce to the proper development of the cow's udder. In training cows with their first calf, it may be wiser to take the calf away at birth.

In order to teach the calf to drink, let it first become hungry, then, placing two fingers in its mouth, lower its muzzle into a bucket or basin of milk. It will begin by sucking the fingers, and gradually, as a little milk is sucked in, it will drink without the fingers, and after about the second meal, it will give no further trouble. Calf feeders may be bought, and if kept scrupulously clean, they may be useful; if not, they are death traps. Here again the habits of the native servant must be reckoned with.

In the event of any appreciable number of calves being dealt with, it is necessary that some special place should be set apart for feeding them in, and that a definite and regular system should be adopted and adhered to. Each calf should be fed separately, and care should be taken that the milk intended for one is not taken by another of perhaps a different age.

The accompanying diagram represents a very simple arrangement of the calf shed, which minimises the trouble of feeding, eliminates error to a great extent, and is at the same time perfectly simple of construction. The dimensions given are those recommended as suitable and convenient for from 15 to 20 calves; but, provided the calves are not over-crowded, and the shed is light, cool and airy, the dimensions need only be considered from the point of view of cost and convenience in building. The shed illustrated is one of the ordinary lean-to type, 20 feet long and 15 feet deep. The front is open except for a four foot rail fence. This fence is so formed that a recess (D) 6 feet square is formed in the centre, giving access to a small manger capable of holding, say, four small buckets.



Section through X-Y

Diagram of calf house for use when hand rearing calves

The manger should be about 6 inches from the ground and have a couple of rails above it. The shed is then divided into three compartments, A, B and C, by gates E and F. At feeding time all the calves are driven into one compartment, say, A, and the gate is closed. The milk, gruel, skim milk, etc., is brought round in large buckets and placed in the recess D. The ration for the first four calves is then ladled into the buckets in the manger and the calves in question allowed (by a picannin at the gate) to come into the compartment B and drink. When they have finished, they are driven through to compartment C, and the next four are brought into compartment B, and so on. In practice, one would bring all the calves of about one age forward first, and then those of the next age, in order to simplify the dealing out of the rations.

So much for the manner of giving the food; we must now consider the far more important matter of the kind and quantity of food to give.

On a stud farm, where the rearing of valuable bulls and heifers is the first consideration, it may be thought that hand-rearing is out of place. This may be so in the case of purely beef animals, but when rearing dairy bulls or heifers for sale, it is of importance not only to preserve and encourage the milking capacity of the dam by milking her, but to be able also to shew exact records of that capacity. When the calf is allowed to suck, no exact record of the milk yield can be kept. In the case of dairy herds, therefore, it is advisable to milk the cows out, to weigh and take samples of the milk, and to feed the whole milk to the calf in increasing quantities, until it is nearing weaning time, when the ration is diluted first with skimmed milk and then gradually knocked off altogether.

It is a simple matter to the practical feeder to judge the daily amount of the ration for each calf, and to make the necessary daily increase or decrease, as the case may be, but it is almost impossible to write down a scale of rations which will be suitable to calves of all sizes, breeds and dispositions. Under the above-mentioned system of whole milk feeding, the scale of rations shewn in table No. 1 may be taken as a guide, to be varied as common sense will dictate, according to the individual calf. It will be noticed that, in the earlier stages, feeding three times daily is recommended. This may be troublesome, but there can be no doubt as to the wisdom of it.

Table No. 1.—*Whole Milk Ration for Hand-fed Calves.*

Age.	Morning.	Noon.	Evening.
	Bottles.	Bottles.	Bottles.
1st week	2	2	2
2nd ,,	2½	2½	2½
3rd ,,	3	2	3
4th ,,	4	none	4
8th ,,	5	,,	5
12th ,,	6	,,	6
16th ,,	4 new, 2 skimmed	,,	4 new, 2 skimmed
20th ,,	2 ,, 4 ,,	,,	2 ,, 4 ,,
24th ,,	4 ,,	,,	4 ,,
28th ,,	milk	ceases	altogether

The dairyman to whom the daily supply of cream and butter is of the first importance, may often find some cheaper substitute for the fat of milk, which will rear his calves satisfactorily and at the same time leave him cream or butter for sale. In the dairyman's case, it is seldom either necessary or advisable to force the calves quite to the same extent as in the case of valuable stud animals, especially bulls, and therefore, if the substitute is not quite so good as the genuine article, there is nothing much lost by using it. Table No. 2 shews the system of calf-feeding for store stock in use at Wye College, Kent, and appears, there, to be most successful:—

Table No. 2.—*System of Calf-feeding in use at Wye College, Kent.*

Age and Weight.	Morning Feed.	Mid-day Feed.	Evening Feed.
1 week ; 106 lbs.	4 lbs. new milk	4 lbs. new milk	4 lbs. new milk
2 weeks ; 121 lbs.	5 lbs. new milk	5 lbs. new milk	5 lbs. new milk
3 weeks ; 136 lbs.	3 lbs. new milk 2 lbs. separated milk ½ pint linseed porridge	3 lbs. new milk 2 lbs. separated milk ½ pint linseed porridge	3 lbs. new milk 2 lbs. separated milk ½ pint linseed porridge
1 month ; 150 lbs.	2 lbs. new milk 3 lbs. separated milk ½ pint porridge	2 lbs. new milk 3 lbs. separated milk ½ pint porridge	2 lbs. new milk 3 lbs. separated milk ½ pint porridge
2 months ; 200 lbs.	6 lbs. separated milk 1 pint porridge ½ lb. hay	6 lbs. separated milk 1 pint porridge ½ lb. hay ½ lb. concentrated food	6 lbs. separated milk 1 pint porridge ½ lb. hay
3 months ; 250 lbs.	6 lbs. separated milk 1 pint porridge ½ lb. concentrated food 1 lb. hay	6 lbs. separated milk 1 pint porridge ½ lb. concentrated food	6 lbs. separated milk 1 pint porridge ½ lb. concentrated food 1 lb. hay
4 months ; 300 lbs.	6 lbs. separated milk 1 pint porridge ½ lb. concentrated food 1 lb. hay	1 lb. concentrated food 2 lbs. hay	6 lbs. separated milk 1 pint porridge ½ lb. concentrated food 1 lb. hay
5 months ; 350 lbs.	6 lbs. separated milk 1 pint porridge ¾ lb. concentrated food 1½ lbs. hay 2 lbs. roots	1 lb. concentrated food 2 lbs. hay	6 lbs. separated milk 1 pint porridge ¾ lb. concentrated food 1½ lbs. hay 2 lbs. roots
6 months ; 400 lbs.	1½ lbs. concentrated food 2 lbs. good hay 5 lbs. roots	2 lbs. concentrated food 3 lbs. hay	1½ lbs. concentrated food 2 lbs. good hay 5 lbs. roots

In this country our calves, as a rule, are not so heavy as the weights given for the various ages in table No. 2; in fact, the weights of ten well-grown and well-fed Friesland calves observed for a period of five months at the Government Experiment Farm were roughly from one-fifth to one-seventh less than those given in table No. 2. In addition to this, we are able in this country to graze our calves for a much longer period of the year than is practicable in England. The writer, therefore, would suggest the rations given in table No. 3 as being more likely to suit local conditions:—

Table No. 3.—*System of Calf-feeding recommended for use in Southern Rhodesia.*

Age and Approximate Weight.	Morning Feed.	Mid-day Feed.	Evening Feed.
1 week	2 bottles new milk	Same as morning	Same as morning
2 weeks ; 100 lbs.	2½ bottles new milk	Same as morning	Same as morning
3 weeks ; 110 lbs.	2 bottles new milk 1 bottle skimmed milk ½ pint gruel	1 bottle new milk ½ bottle skimmed milk ½ pint gruel	Same as morning
1 month ; 120 lbs.	1¼ bottles new milk 2 bottles skimmed milk ½ pint gruel	1 bottle new milk 1 bottle skimmed milk ½ pint gruel	1 bottle new milk 2 bottles skimmed milk ½ pint gruel
2 months ; 170 lbs.	4 bottles skimmed milk 1 pint gruel ½ lb. hay	2½ bottles skimmed milk 1 pint gruel ½ lb. hay	Same as morning
3 months ; 210 lbs.	4 bottles skimmed milk 1 pint gruel ½ lb. concentrated food 1 lb. hay	2½ bottles skimmed milk 1 pint gruel ½ lb. concentrated food	Same as morning
4 months ; 260 lbs.	3½ bottles skimmed milk 1 pint gruel ½ lb. concentrated food 1 lb. hay	½ lb. concentrated food 1 lb. hay	Same as morning
5 months ; 310 lbs.	3½ bottles skimmed milk 1 pint gruel ½ lb. concentrated food 1½ lbs. hay	½ lb. concentrated food 2 lbs. hay	Same as morning
6 months	Gradually leave off milk altogether		

Whatever the ration adopted, the commercial aspect of the system must be kept in view. A system that may be profitable to one man under one set of circumstances may be quite in-advisable for another man under another, but wherever calves are hand-fed, and whatever the ration may be, the following instructions should be carefully borne in mind, namely:—

(1) Except it is not possible, because of the sickness of the cow or some similar reason, the calf should always have its own mother's milk for the first few days, or until the milk has become normal. If this is impossible, choose milk from a cow giving a low percentage of fat, such as a Friesland, rather than rich milk, such as a native cow usually gives. Watch the bowels carefully to see if they are acting properly, and if not, give a couple of tablespoonfuls of raw linseed oil or castor oil, and repeat the dose if necessary.

(2) The milk or gruel should always be fed at about the temperature of milk as it comes from the cow, *i.e.*, about 95 degs. Fahrenheit, and care should be taken to see that the temperature is always approximately the same. If from any cause, such as the refusal of a young calf to drink at first, the milk becomes appreciably cooled, it should be warmed. The safest plan is to use a thermometer, notwithstanding the fact that with practice one is able to judge the temperature very nearly. When heating milk, place the vessel containing the milk in another vessel of hot water, and stir until the required temperature is reached.

(3) The most convenient and best way of measuring milk is to weigh it. An ordinary spring balance capable of weighing up to, say, 50 lbs. is quite sufficient for this purpose. The comparative scale of weights and measures shewn in table No. 4, and which is sufficiently correct for all practical purposes, will perhaps be useful in this connection:—

Table No. 4.

Imperial Pints.	Imperial Quarts.	Bottles.	℔s. ozs.
1⅓	= ⅔	= 1	= 1 10½
2⅔	= 1⅓	= 2	= 3 5
4	= 2	= 3	= 4 14½
5⅓	= 2⅔	= 4	= 5 10
6⅔	= 3⅓	= 5	= 8 4½
8	= 4	= 6 or 1 gal.	= 10 0

(4) Milk that is sour, or milk from a sick cow or one that

is bulling, or is excited unduly from any other cause, should not be used.

(5) Great regularity should be observed in the time of feeding calves. Half an hour too late or too soon is not nearly as good as the right time.

(6) The porridge or gruel recommended is made by adding to 2 lbs. of linseed meal and 2 lbs. of maize meal, boiling water to the volume of one gallon. The mixture will keep good for several days. The allowance should be mixed with the separated milk. As linseed will not grind conveniently unless mixed with some dryer seed to soak up the oil, the linseed and maize may be mixed before grinding.

(7) All changes of feed must be made gradually.

(8) Concentrated food and sweet hay may be given from the age of three weeks. The concentrated food may consist of maize meal, linseed meal, or linseed or ground nut cake crushed fine, pea meal, bean meal (in small quantities), sifted buckwheat meal, wheat or maize bran, crushed oats, etc. The thing to bear in mind is, that a young growing calf requires nitrogenous foods rather than large quantities of starchy foods, and easily digestible foods rather than quantities of crude hard fibre, like very hard old grass, for instance. In summer, or in mild weather, when good short sweet grass is available, green stuff or roots will not be required, but in winter a little green barley or oats, Napier's fodder (chopped fine), lucerne, pulped pumpkins or roots, crushed monkey nuts and some good hay, such as Teff, or the short broken parts of velvet bean hay, monkey nut vines (chaffed), or good veld hay, will be much relished.

(9) Young calves do not require a great deal of exercise beyond that obtainable in a roomy, airy, clean pen. After a month, a few hours a day, when the weather is mild, on short sweet grass, will do them good. In wet, cold or very hot weather, they are better indoors altogether when young, or up to, say, six or eight months old.

(10) Cleanliness must be the watchword of the calf-feeder in everything—cleanliness in giving the milk ration, cleanliness in giving the solid food, and cleanliness of the pens and bedding. A small low manger is advisable for feeding solid food, and any food left in it should always be cleared out and used for the pigs or fowls. It should never be allowed to remain and make the manger sour.

Fertilisers and the Relation between Cost of Production and Prices of Farm Produce.

By George N. Blackshaw, B.Sc., Government Agricultural Chemist.

In discussions upon agriculture, it is often assumed that the most successful farmer is the one who obtains the heaviest returns, large yields being the farmer's antidote for the high cost of living and protecting his income when prices are low. These assumptions are so influenced by varying factors, however, that they cannot be blindly accepted as truisms, for the reason that in successful practice the relation between cost of production and prices ruling for farm produce is the all-important consideration.

In this short article upon farm economics, I intend to confine my attention to the practical application of the economic laws governing agricultural production in respect of the use of fertilisers, and shall endeavour to shew the progressive agriculturist that as much discretion is required in the purchase and use of fertilisers, as in other branches of the farming industry.

In the leading agricultural centres of this Territory, we are emerging from a system of pioneer farming, in which the producer has relied solely upon the virgin fertility of the land for his crop, to one in which some attempt is at least made to maintain the fertility of the soil by manurial treatment. This advance applies more particularly to the lighter types of arable land, and not so much to the heavy black soils rich in accumulated fertility, and capable of carrying heavy crops in favourable seasons for many years to come.

On the lighter red soils, the use of fertilisers for maize production, whereby higher yields are obtained, has become a common practice, and the question which naturally suggests itself to the farmer is the amount of money he can expend in fertiliser per acre so as to give him the best financial return. This must vary with the class of soil, but in regard to manure and crop production, there is one general principle which always holds good, namely, that the greater the expenditure in manure or fertiliser, the greater the cost of the increase resulting from the outlay. To illustrate this fact, let us consider a case in which the yield of maize was increased three bags by an expenditure of 15s. per acre in fertiliser, this increase being given in the first season after the application of the manurial dressing. Neglecting the value of the manurial residue remaining for succeeding crops, the outlay in fertiliser to produce an extra bag of grain was thus 5s. Had, however, double the dressing been applied, the increase would not have been doubled, and consequently the outlay in fertiliser per bag increase would in such a case have been more than 5s. We could, in fact, continue to increase the dressing of fertiliser until a stage was reached when the last addition had no effect at all. The example cited shews that, whilst an outlay of 15s. per acre increased the yield three bags, an increase of six bags would cost more than 30s., the natural deduction being that the production of heavy yields by means of a too liberal use of fertiliser will not recoup the farmer for low prices.

Careful maize manurial trials have shewn that a moderate expenditure in suitable fertiliser pays well on certain soils in favourable seasons, but from what has already been said, it will be evident that the question to put to ourselves is not how much we can produce per acre, but how much we can afford to produce. It must be clear that we cannot recklessly increase the yield.

It is for this reason that the writer does not favour any proposal for a maize growing competition which lays down that the competitor who can obtain the heaviest yield of grain from one selected acre of his land shall be the winner. The results of such a contest would provide very interesting data, but it is doubtful if such information would be of much practical value, for the simple reason that on so small an area the competitor could expend a sum of money in manurial treatment which would be far in excess of that which could be profitably expended on a large scale.

Cost of production must always receive careful consideration in agricultural practice, and it naturally follows that the amount a farmer can afford to expend in production must depend upon the price realised for the product; the higher the produce price, the greater the amount of money he can profitably expend in growing that produce.

Extreme yields, involving heavy expenditure, are profitable only with high prices; on the other hand, we must not continue to crop land year after year without paying due regard to the maintenance of soil fertility, for so long as continuous cropping is practised, the produce sold direct and no manures or food-stuffs brought on to the farm, the fertility level of the land will assuredly fall. Derelict farms in parts of the United States are examples of this system of farming. On these abandoned farms the fertility was reduced to such an extent that the land could no longer be used for the profitable raising of crops, and such must sooner or later be the inevitable result on every farm where similar methods are adopted.

A moderate increase by economic methods and not extreme yields must be the objective in sound agricultural practice.

The Cattle Industry in Texas.

(An Address delivered by Mr. J. M. Sinclair, Chief Veterinary Surgeon, to the Agricultural Union Congress, regarding his recent visit to Texas.)

After some introductory remarks, Mr. Sinclair said the area of Texas comprised 265,000 square miles, compared with the area in Southern Rhodesia of 153,000 square miles. It would be seen, therefore, that Texas was more than one-and-a-half times the size of this Territory. Cattle rearing in Texas nowadays was not the main industry really. Various crops were grown, of which cotton was the principal, and engaged the attention of the greater number of farmers. The value of the cotton produced annually was from 50 to 60 million pounds sterling. The production of cotton seed cake was £8,000,000, corn or maize £20,000,000, wheat £2,000,000, kaffir corn, milo and light crops £3,000,000, oats £2,500,000, dairy products £3,000,000, and the sugar cane crop was enormous. They had 35,000 acres under sugar cane. Roughly, his tour in Texas was divided into two parts—the low veld and the high veld. The low veld was practically the redwater country, and here he spent most of his time. It was flat country, generally treeless and not too well watered, and fairly well covered with grass—mostly covered with grass. In the southern part of Texas there was a splendid underground supply of water pretty well everywhere. It was obtained by boring from 80 to 90 feet, and it was even got at depths of 300 to 400 feet. In some cases the water at 80 or 90 feet was very brackish. The country was on the Gulf of Mexico, and being near the sea might account for the brackish water; but when they got through the brackish water they got a clear and good supply.

He arrived in the northern part of Texas from Forth Worth. When he woke up he thought something had happened, the change in the country was so great. It was like arriving in the country somewhere between Gwelo and Bulawayo. The country generally was flat and treeless. The scarcity of trees was one of the important differences, as the area he had referred to in Matabeleland was fairly well covered with trees. Apart from that the general features of the country and the nature of the grass were similar to the country in Matabeleland. The country was not very well watered. They saw big rivers with water only running in them in the rainy season. There were various conditions in Texas which struck him as being very similar to those which existed in Rhodesia. The seasons were similar to those in Rhodesia, except that they were reversed. Texas being north of the line, they got their summer while Rhodesia got its winter. He was there in the season of October and November, and it was exactly like the winter in Rhodesia. They had bright days and strong sun, but as soon as the sun went down the bite of the cold was felt. Another thing which struck him very much was in regard to the older types of cattle. He passed round the Congress a picture of an old Texas long-horn steer. If the label was cut off the picture he suggested that many of those present would recognise an old friend. The steer was like the Africander ox. Another breed of cattle was the Mexican. He did not think they were as good beasts as the Mashona or the Matabele; that was to say that the latter were a more level type. Amongst the Mexican cattle they saw all sorts of conditions and shapes, weedy, bad animals. In the early days there they had redwater and enormous difficulties; they had not had plagues like rinderpest or African Coast fever, but he thought that redwater caused them a greater loss than African Coast fever had caused this country. There was another similarity, which was that they first began by importing cattle for the purpose of grading up their indigenous stock; in that connection they had exactly the same difficulties as were experienced in Rhodesia. Rhodesia was passing through the same stage in regard to the development of their cattle industry which the Texans passed through 30 or 40 years ago. They brought cattle from the north and east and from Europe, and the mortality was enormous. Now they had many herds of pure-bred cattle, so that they had not to import from the non-redwater area. Some of the best breeders when they wanted to introduce new blood went north and east, and some occasionally went to England to buy pure-bred stock. They had also had the difficulties of acclimatising from redwater and gall-sickness, as the farmers of Rhodesia have. He had met many of the old Texans, and he had been told by them that one of their greatest difficulties 30 or 40 years ago was that they had hundreds of thousands of cattle and no market for them. They had even to slaughter them simply for the hides and tallow. Those conditions, however, had passed away, and the country was opened up by means of railways; there were no stock roads in the country. The country, in fact, was so well supplied with railways that there was no difficulty in getting the cattle to a point on the railway whence they could send them direct to market by rail. He mentioned that an interesting book had been written by one of the oldest ranchers in Texas, and he (the speaker) recommended it to the notice of the farmers. It was entitled "Reid Anthony: Cowman." It illustrated the difficulties and trials of the earlier Texans in opening up the country.

During his stay in the country he practically made Forth Worth his headquarters. The town had a population of close on 100,000. It was the fourth largest town in Texas and a large cattle centre. In fact, he thought he was correct in saying that it was the fifth largest cattle market in the United States. They had accommodation in their stockyards for 26,000 head of cattle. The number of cattle which passed through the stockyards every year was close upon one million. He had seen 4,000, 5,000 and 6,000 head of cattle in the yards. It was also a city containing two packing houses belonging to the largest firms of packers in the States—Armour's and Swift's. Those packers or canners were really the wholesale butchers of the country. They bought all the fat stock and the slaughter stock, and the stock were slaughtered by the thousands and put into cold storage. On the railways they had refrigerating vans, and the retail butchers came from all parts of the country to those centres. They went to Armour's or Swift's, bought their carcases, and they were sent down in refrigerating vans. So that really the retail butcher as he was known in Rhodesia did not exist in Texas. It was simply the big packing houses and the retail butcher who got the carcases and cut them up for distribution. In additon to dealing with wholesale butchers they also dealt with butter, poultry, eggs, pork, bacon and products of that kind. In the stockyards of Forth Worth he first saw some young stock from 12 to 15 months old. They were very high grade Shorthorns and Herefords. He thought there were 2,000 or 3,000 head of cattle in the yards the first day he went there. There were also as bad cattle as he had ever seen in his life. He did not think that Rhodesia could match them in Mashonaland or Matabeleland. That was due to a very great extent to a large strain of Jersey. The dairy industry was a big one in Texas, and the dairyman went in very largely for the Jersey. The Jersey was an excellent milking machine, but a bad animal for any other purpose, especially when crossed up with other breeds. He met quite a number of cattle men from all over Texas; they came in for a week to sell their cattle. He had met one gentleman, named Mr. Whitehead, a rancher on the Mexican border. He described to the speaker a disease known as the "creeps." It appeared to be very similar to stiff-sickness known in Rhodesia. It only occurred in the particular district in which Mr. Whitehead was farming, and only in the dry season. Then he described a disease in sheep known as the "queers," which was something like blue-tongue. Amongst the ranchers visited was a Mr. Cooke, who was ranching at Bevil, where they had a very large herd of Herefords pure-bred. Then there was the Tafe ranch, in San Patricio country, on the south coast. On that particular ranch they were farming Shorthorns entirely. Then the next ranch was the King ranch, owned by Mrs. King, which was the largest ranch in the States at the present time. It was comprised of over one million acres, and there were between 60,000 and 70,000 head of cattle on it, several thousand horses, and they also raised mules and went in largely for sheep. They were cutting up a portion of the ranch into smaller settlements and selling those portions to people with small capital. Another ranch was the Kennedy ranch, also on the Gulf of Mexico. Here there were Shorthorns, Herefords and Devons. Those, of course, were farmed in separate camps. He also visited the Adair ranch, where Mr. Walsh (now of the British South Africa Company) was for some time, and where they ranched Herefords only.

The general principle in ranching—at least, so far as he (the speaker) could see—was that they had a central or home farm with a herd of pure-bred stock. That herd was kept for the purpose of breeding ranch bulls. In all their ranching in Texas they bred from nothing but pure-bred animals. They had no time for the half-bred animal. They had a central farm, then the ranches or ranges were divided into paddocks of from 10,000 to 15,000 or 20,000 acres. The breeding cattle were there and were run year in and year out, day and night, although they were sometimes changed from one pasture to another. There was no kraaling the same as there was in Rhodesia. There they had not the same difficulties as were experienced in Rhodesia in the way of vermin, lions, etc. Speaking in reference to bulls, Mr. Sinclair said that in some cases the bulls were allowed to run on the ranch all the year round, except perhaps in the winter, when poor ones were taken out and fed. In the case of Mr. Cooke at Bevil, that being one of the most progressive ranches in the country, they were taken out and fed and put back again on the ranch, and were ready for service about January 1. A ranch bull was, generally, not the sort of animal they saw in a show ring. They were hardy animals, and did not carry much flesh, but the frames were there, and the bone and the breeding also. If the bulls were fed they would soon have the animal of the show type. The average proportion of bulls to cows used on a ranch was one to twenty. On one or two ranches they ran as low as one bull to fifteen cows. The average, however, seemed to be one to twenty. In regard to calves, the general opinion seemed to be that they regarded a very wet season as a very bad calf year, and he (the speaker) thought that South African experience would bear them out in that respect. They reckoned 70 per cent. of calves was a good year, and if the conditions were dry and hot the percentage might drop to 50 or even lower. One of the things which surprised him on the ranches was the provision made for winter feeding. He did not want to convey the impression that they provided winter feed for 30,000 or 40,000 head of cattle on the range. They made provision for winter feed in case of drought or a bad year, and they would thus be able to carry over their cattle, which might get poor. That winter feeding consisted entirely of ensilage—of kaffir corn, mealies and sugar cane. He had asked them particularly what they had found to make the best ensilage, but no one appeared to be able to give him a definite answer. They said that the question had not been decided, and was in the experimental stage. Most of them used kaffir corn and mealies. Their silos were built of lumber, there being plenty of wood to be obtained and cheaply. They were about 32 feet high by 24 feet in diameter, and they were circular, with a capacity of 250 tons. On one ranch he saw them filling the silo. They had about 16 teams of mules riding the stuff and steam tackle chopping it up, and in the silo they had seven or eight men spreading it out. They filled it up, and when it sunk a little they kept on adding to it until the silo was absolutely settled down full.

Speaking of food-stuffs, Mr. Sinclair said that ensilage was the main item of food for feeding their stock; cotton seed meal was also used. With their enormous cotton crop the cotton seed was one of the most valuable things produced in Texas from the point of view of the cattle man. It was a splendid cattle feed, and naturally, as it was grown by the farmers themselves, it was an economical and cheap feed. On some of the ranches they were beginning to feed their calves as soon as they were weaned. They put them into an enclosure and kept them there for a week or ten days to prevent them getting back to their mothers. On one ranch he saw 1,000 Shorthorn calves four days after being separated from their mothers. The manager, a most progressive man, claimed various advantages for this feeding of calves. He said in the first place he taught the calves to eat artificial food, viz., ensilage and cotton seed meal. The second advantage was that it accustomed the calves to being handled and the presence of human beings. Cattle bred in the old style of range conditions got frightfully wild, and there was a difficulty in rounding them up when they wanted to send them to the market. If the calves were handled when they were young it saved time and labour subsequently. The greatest advantage claimed by the gentleman to whom he was referring was that the calves never got a set-back. From the time they were weaned they were put on a very nutritious diet of ensilage and cotton seed meal, and the calves were kept going. The feeding was continued for two or three months, and he had been informed that the rancher reckoned it did not pay to put more than 8s. or 10s. of such feeding into the calf. Those ranchers could say exactly what each calf was costing them per day. He had seen on one place at Coleman some cattle yarded for the purpose of being fattened—2 to 2½ year old steers. They were penned up in from 20 to 30 acres, and they were rationed on 30 lbs. per day of cotton seed husk and a certain amount of cotton seed meal mixed with it—from 1 to 1½ lbs. The husk looked to him to be like cotton waste. "Surely," I said, "the animals do not live on that? Does it not kill them from constipation?" The answer was: "No; they get fat on it. They fatten in from about 90 to 100 days, but you cannot keep them on it. If you cannot get them to market within that time the cattle go off, because of the ill-balanced ration." As a matter of fact the cattle go blind and suffer from various nerve troubles and paralysis. It was a cheap method of feeding cattle because the cotton husk was waste, but they had to sell their cattle at the proper time, otherwise the feeder would incur a big loss.

Mr. Sinclair next referred to the campaign that the Federal and States Governments were waging towards the eradication of redwater. The southern part of Texas was grossly infected, at least some parts of the territory, and for the last 10 or 15 years the Federal and States Governments had been conducting a campaign towards its eradication. The quarantine line between the redwater and non-redwater areas was clearly defined. They dipped all the cattle for eight or nine months, and they found they could eradicate redwater infection by regular dipping for that period. During the last 10 or 12 years they had eradicated the disease from close on 20,000 square miles of territory. The campaign was still going on, and of course it was very expensive, but they hoped by consistent and continual effort to eradicate redwater from the United States. In Southern Texas, where large numbers of cattle were raised and bred, a ready market was found for them in the north, or the middle west as they called it—where foodstuffs were plentiful. The cattle from the redwater area were permitted to leave the area and go into the clean area under very stringent conditions.

At Forth Worth and other places they had quarantine station areas. The cattle were dipped and put into those areas and fed on hay known to be free from ticks, and they were examined daily. They were dipped again on the tenth or twelfth day, and on the seventeenth or eighteenth day. If on close inspection they were found to be tick-free, they were put into sealed trucks at the central station and given a clean bill of health to go to the non-redwater area. It was an expensive and elaborate process, but there were tens of thousands of cattle sent every year to the clean area. On the question of redwater, there was another point. On some of the ranches where dipping was regularly practised, especially where they had high-grade stock, they inoculated their calves for redwater every year. If they did not do so some calves might escape the process until they were 10 or 12 months old. If they did get the disease then, their growth was interfered with. If the calves were inoculated whilst suckling, they passed through it without really any symptoms of illness. Another affection they got in Texas was sand-burn or sun-burn. In the hot weather some of the cattle, especially those in which the white colour predominated, got burnt with the sun. Then they got eye troubles, but they were very free from eye troubles on the whole. They occasionally got ophthalmia. In regard to Herefords, he had been informed that they were more subject to eye-disease than other breeds. Of course, this was an individual opinion given to him. Other ranchers had told him that they did not think that Herefords were more susceptible to eye trouble than any other breed. He next referred to the screw worm, which was something like the maggot fly. The screw worm laid its eggs on the animal, and if it were not attended to quickly, the worms would kill the animal in two or three days. During the season, in the summer months, practically the whole of the rangers and cowboys were always out going through the cattle to find any animals struck with the screw worm. The cowboys took chloroform with them in their wallets, with which they treated the disease, and a cure was very quickly effected by it. In regard to the different breeds of cattle, he said that the general opinion was that the Hereford was the best animal for range purposes; it was a better rustler. The Hereford and the Shorthorn were used mostly for range purposes. He had seen a few Devons. What had struck him particularly was the extraordinary evenness of the type of cattle on the ranges visited. He was surprised at that. On the King ranch he visited the breeding camps, and he also saw one and two-year-olds. He mentioned the extraordinary evenness to the manager, and said that that was what had struck him—evenness of type. It seemed to him that all of them might have come out of the same mould. They were the same in contour and colouring. The manager said: "That is the biggest compliment I have had paid to me." He also said that when he came to the ranch he had his ideals, and the cattle there now were the results of his ideals. At the Kennedy ranch they had Brahmin cattle. They were supposed to be tick-resistant and redwater-proof. Mr. Kennedy was experimenting with them, and was trying to get a cross with the hope that the animals would be more resistant to ticks and redwater. He might be able to do so, but he (the speaker) thought if he did attain that object, it would be at the sacrifice of the quality of his cattle. He had also been told not to forget that some of the best Hereford herds of range cattle in Texas had been bred up from Shorthorns. Another rancher had nothing but Herefords, and he put a cross of a Shorthorn in every year. Their heifers were put for the first year's calves to the Shorthorn bull. They saw little trace of the Shorthorn, but still it was there. The object was that the Hereford had the tendency, he did not say to degenerate, but to become smaller. They put in a Shorthorn with a bigger frame to maintain the size. On some future occasion, perhaps, he would prepare a paper which he could read at the various Farmers' Associations, paying more particular attention to some of the points than he had been able to do that morning in the time at his disposal. (Applause.)

After replying to various questions, Mr. Sinclair concluded by expressing the opinion that when Rhodesia had been as long cattle farming as they had been in Texas, they would have equally good results to shew.

Aims and Methods of Stock Breeding in German South-West Africa.

(*Note.*—The following is a translation by Dr. E. A. Nobbs of a lecture delivered by Dr. Hartig, of Liebig's German Farming Company, at the Agricultural Show at Windhuk, German South-West Africa, in 1914, published in "Der Sudwesthöte" newspaper of 5th June.)

A subject such as the one chosen, regarding the breeding of live stock, is surely not out of place on the occasion of this agricultural show, where we ought not only to exhibit what has been accomplished, but should endeavour to obtain enlightenment as to means for further progress in this young country.

I had the privilege of working on the prize committee. Our first difficulties arose in deciding along what lines to judge our live stock; whether we were to continue along old lines without combating strenuously the past errors of omission, or to adopt proper fundamental principles. Cattle breeding is the mainstay of the farming industry of the country and the chief source of profit; it is of immense economical importance, therefore, that we should be quite clear as to the lines on which it is to be run.

Much has in the past been written about cattle breeding, and there is always much being said about it, but I hold that we ought to discuss and exchange ideas on the subject much more, and that we must labour the subject more vehemently in order to obtain even fuller knowledge. Personal ill feeling must be studiously avoided in these disputes, regarding which men of good repute may be of entirely contrary opinion. If one peruses the newspapers and magazines from England, Australia or the Cape, such as the "Pastoralist's Review," the very interesting "Midland News," the "Farmers' Weekly," or the "Agricultural Journal," one meets there most varied opinions defended with great heat, but without individual animus or bad temper of any kind whatever.

I do not need to tell you that our land is predestined to have a great pastoral future. We all know that countries such as Australia and the Argentine float before our eyes, and with silent envy we see the enormous growth of wealth which falls to the lot of those settlers who were first in the field. Well, gentlemen, we need not doubt but that the same may happen to us. First, however, there is much work to be done, and we should learn to avoid the mistakes which have hampered development in other countries.

I omit reference to horse breeding. The matter is in a promising condition; several societies have already been formed in the south similar to those already formed for cattle at Outjo and Gibeon, ahead of us in the central districts, who are always so proud of our economic progress.

As to sheep farming, it is too much in the experimental stage still to allow of advantageous co-operative effort; besides, the breeding of woolled sheep does not require immediate attention, as there are no native types of this class to preserve, and because sheep farming is everywhere in the world a matter of individual enterprise.

We have now to consider the matter as regards horned cattle. We have here two main factors to deal with: the female stock, originally in the country or introduced from neighbouring lands, and the male stock, mostly, but not all, of imported origin. There are as many opinions as to what is best as there are kinds of grass on the veld. By preference everyone keeps the breed of cattle with which he was acquainted in his home: and one could bring together in this country a veritable sample collection of every known German and foreign breed. The following breeds are to my personal knowledge represented in this country, either by male or female specimens:—

Native breeds.—Ovambo, Damara, Red Africander, Black and White Africander, Bechuana and Barotze.

British breeds.—Ayrshire and Polled Angus cows, and Hereford, Durham, Devon, Sussex and Shorthorn bulls.

German and Swiss Mountain breeds.—Simmenthal, Pinsgau, Schwyz, Vogelsberg Red, Algaü and so forth.

Low Countries breeds.—Dutch, Friesland, Wesermarsch, East Prussian Black and White and Silesian Red.

Well, gentlemen, is this fact to be regretted or not? I think not; provided, however, we sum up the result of all these experiments in time, and utilise the information so gained as to the relative merits of all these breeds, by comparing them according to the object for which they are bred, and contrasting nearly related breeds together.

For the purposes of our agricultural shows, we require four separate groups of breeds, viz.:—

1. *African breeds.*—This will soon come down only to the Red Africander breed, as the maintenance in its purity of any other native breed is a matter only of scientific—not of economic—interest. The characteristics of native breeds are a high degree of hardiness, suitability to our climate, sure fecundity, flesh, and in a lesser degree milk.

2. *German and Swiss Mountain breeds.*—Characterised by early maturity, form, flesh, and in a lesser measure milk.

3. *Lowland breeds.*—Whose characteristics are early maturity and milk, and to a lesser extent a good weight of carcase.

4. *British breeds.*—Characterised by form and flesh, and in the highest degree by early maturity.

In the prize lists classes would then be provided for each breed; simply for bulls according to age, for cows, for oxen not over four years old. Competing animals would then stand near one another.

Horses, too, should be arranged more according to type. To improve our mules, we should introduce half-bred (horse) stallions. It is impossible to judge in one and the same class such different types as Percherons, Hungarians and East Prussians.

An essential necessity will then be possible, that of judging by points, as is done in Germany. The decisions of our judges would then be purely objective and unassailable, as the scale of points has been laid down by the breed associations themselves. Much ill feeling would thus be avoided, the exhibitors would gain greater confidence, and the judging can be carried on consistently. Gentlemen, it is a great gain if we can put an end to competition between breeds belonging to different groups, as Swiss against Friesland, or Simmenthal against Shorthorn. As within each of the four proposed groups the characteristics are more or less alike, we gradually come out of chaos into some sort of a system. We find out which breed in each group is best suited to the country, or to a particular class of farming, such as ranching, dairy farming, mixed farming, and so on. Comparisons within the groups follow later. The most suitable breed will be most largely and best represented in the group classes at our shows, and its breeders will be the first to unite for their common interests. The results of this will be the formation of stud books and breed societies, and there will by degrees and naturally arise an organisation such as could not otherwise come into existence amongst our very isolated and independent farmers. Purely material interests must form the first motive, and why not?

The first question you will ask me now is, "What benefit will a stud book confer on its breeders?" and the second is, "How would it be conducted in this country?" I should like to answer both questions together by means of an example, that of the formation of an Africander Cattle Stud Book, only premising that this case is selected as a sample and not because I want to replace all breeds of cattle by the Africander—far from it. What I hope to see is separate stud books established within each of the above-mentioned groups for each breed—for the Friesland, the Simmenthal, the Herefords, and so on, whichever is best adapted to any particular class of country.

As I am speaking from my experience and to practical men, will you please allow me to indicate to you the method adopted by the Deutsche Farmgesellschaft (Liebig's German Farm Company) to produce the most profitable animals possible under existing conditions of veld, water, climate, and so on?

From the commencement, we have had a good rate of increase, and have now about 12,000 head, and that on sand veld in the districts of Gobabis and Okahandja and in the rocky Khomas plateau. The cows I bought were very mixed, but mainly of three types: black and black and white Africander, red and red and white Africander, and odd coloured stock of varied breeding, partly half-bred Simmenthal, Vogelsberg, and so forth. How were these to be sorted out, and on what system was breeding to be conducted? As they are the hardiest, and can do on the least good veld, I sent the red Africanders into the Khomas mountains, and for the most part put Africander bulls amongst them, separating out two special herds, one to be kept pure Africander, the other to be improved by means of Sussex bulls. The reasons for trying to produce as pure and good Africander stud stock as possible, and as well as a high-class beef breed, are based on experience in the Cape. There, as here in German South-West Africa, they introduced many European breeds of cattle, and after these had multiplied, when prolonged droughts occurred, they found that the Africanders could best withstand unfavourable conditions, and remained fat and gave a calf every year.

After several generations of the grading process, the native type tends to disappear, and we must have some of the pure and true Africander blood to come back to in case of need, as the refined stock may be unable to withstand the scorching heat and droughts of this country. For such purposes I am convinced that we ought not to import from the Union, but that by careful selection we will get quite good material in this country.

The mixed stock, mostly good milk cows, were placed on the best grazing in the Barmen district, to supply milk. These are being crossed with bulls of various dairy breeds, chiefly Friesland, though I should prefer, if I could get them, the milking type of Shorthorn from Australia.

The black and black and white Africanders were sent to the neighbourhood of Ovikokorero, the ideal cattle country of the Hereros, and are being crossed with bulls of their own class, and with Frieslands, and in the special herd there Wesermarsch bulls have been introduced as being of similar character to the Friesland, but with a greater tendency to beef production.

Still farther up in the true sand veld at Otjombindi I collected all the red and white cows of Hereford character to form a Hereford herd, as that is the most desirable type for that region.

From these examples you will see, gentlemen, how on a small scale, and with such sires and dams as I had at my disposal, I have evolved a system of breeding, and it remains to remark that just as in these instances, so throughout the country as a whole, no single uniform plan of breeding is possible. Each must ask himself first what he wants to achieve, and secondly what he can attain to. Every farmer has done as we have, and used the best bull he could get, and so it has come about that most of our herds are made up of cross-bred animals of every description, and for that very reason, if we want to arrive at some definite end, we must consistently use bulls according to a fixed and definite system. This is the fundamental rule for our cattle breeding.

As a makeshift we have to use the half-bred bull, and for want of a better, he has got an excuse for his existence to-day. A place has therefore been provided for him in our show prize list, but it should be borne in mind that the chief value of these classes is to shew what the results of certain crossings will produce, rather than that they should furnish us with stud stock. There is no help for it, the half-bred bull must by degrees give way to the pure-bred sire, bred and acclimatised in this country. The scientifically produced pure-bred sire is the only one that can be relied upon to produce his like, and we cannot too soon introduce such animals, particularly amongst our very varied and cross-bred dams.

The Imperial German Government takes the greatest interest in efforts in these directions, and has expressed its willingness to assist farmers, provided they are organised into bodies for the purpose, by means of contributions towards the cost of importation of pure-bred animals and by prizes at agricultural shows. It is hoped that the Government experts will also place their knowledge and experience at the disposal of stud book associations.

Besides these advantages, the associated breeders will reap the fullest benefit of any increasing demand for bulls. This demand is already enormous, especially, I can assure you, for pure Africander bulls (which cannot in the slightest degree at present be met). This is an indication that many farmers have already graded up their stock to an extent beyond the capacity of their farms to sustain, and that they must breed back for hardiness by using Africander bulls. This over-improvement is first observed by a reduction in the percentage of calves obtained from the better bred cows, although the improved size and growth of the oxen is apt to hide the fact. I may also add that the market for Africander bulls is likely to extend to all parts of tropical Africa, as being the type most likely to improve the native cattle of those countries. So far as these often much degenerated native breeds can be improved at all, it is by the red Africander as a transition stage to the European breeds that this can be done.

I have explained to you the advantages of a stud book, and you will agree with me that it is well worth some trouble if in place of the 120 marks (£6) for an ox, you get 250 marks (£12 10s.), or 400 (£20), or up to 1,000 marks (£50) for a good bull.

The President will deal directly with the Government on matters connected with the purchase of suitable breeding stock, and will arrange for the buying and importation and other thankless parts of the business, the Government merely furnishing a contribution. In this way both parties are accommodated. The Breeders' Association will do all the work. Help yourselves, and do not take everything to the Governor. Must we wait for a proclamation for every little thing? Have we not enough interest in the breeding of live stock to lay down lines of work for ourselves? Must all initiative emanate from the Government Offices? We often press for self-government, and are we not to manage for ourselves the very matters which we ought best to understand and which concern our closest interests? Establish stud book societies for each separate class of stock, to look after the interests of the breed, and to extend the markets. Then let these various societies combine to form a central organisation, a stud breeders' association for the whole of German South-West Africa, similar to the German Agricultural Society, which serves as a model, the innumerable benefits of which even extend to our young country.

The Fattening of Pigs on Granite Farms in Mashonaland.

By R. C. Simmons, Chief of the Animal Industries Branch.

On many granite farms in Mashonaland, and indeed on almost all granite farms, the potato is a fairly prolific cropper provided the season is at all reasonable. Unfortunately, owing to the difficulty of storing it for any length of time, it is a crop which commands a high price one week and for which there is perhaps scarcely any market the next. The writer was asked recently by a grower of potatoes for some information as to their value as a pig feed, and this article is practically the information given to him, and which, it is thought, may be of general interest.

The factors chiefly taken into consideration were: (a) the value of potatoes, (b) the proportion of the whole ration which might profitably consist of potatoes, and (c) the other available food-stuffs (with their values) which might be used to supplement or correct the potato ration. The regular reader of the *Journal* will remember that in making up rations for pigs or other animals, the total solid matter and the proportion of nitrogenous and non-nitrogenous substances contained must always be kept prominently in view. The following trial rations all conform more or less to scientific and practical requirements so far as quantity and quality are concerned, and it must be on financial grounds chiefly that we must make a choice from amongst them.

It was found that, in addition to potatoes, mealies, monkey nuts, beans and majordas or pumpkins could be grown fairly easily, and that skimmed milk was also available at times. The object aimed at has been to use as many potatoes as possible. It was found by trial calculations that there was very little profit attached to feeding the various stuffs enumerated to pigs if there existed a reasonable cash market for them.

The food-stuffs have, therefore, been taken at their cost of production on the farm, on the assumption that the pig would be used as a means of marketing them in the form of pork, when no cash market existed.

Ration No. 1.—For pigs from 2½ to 4 months old running on fairly good pasture during a portion of the day:—

Food.	Ration in lbs.	Cost of Production.	Approx. Daily Cost in Pence.
Potatoes	2	2s. 6d. per bag	.400
Monkey Nuts	¾	½d. per lb.	.375
Mealies	½	4s. per bag	.120
Melons	5	10s. per ton	.060
Totals	8¼		.955

This ration costs a fraction less than 1d. per diem. It is somewhat short of starchy matter, but, as the monkey nuts used would probably be inferior and would contain a good deal of shell, it is probable that it would be satisfactory in practice.

Ration No. 2.—Alternative to Ration No. 1:—

Food.	Ration in lbs.	Cost of Production.	Approx. Daily Cost in Pence.
Potatoes	4	2s. 6d. per bag	.80
Skimmed Milk	5	½d. per 10 lbs.	.25
Beans	½	10s. per bag	.30
Mealies	½	4s. per bag	.102
Totals	10		1.452

This ration is therefore nearly ½d. per diem more expensive than Ration No. 1.

Ration No. 3.—For pigs from 4 to 6 months old on grazing or getting what they require in the way of majordas or melons:—

Food.	Ration in lbs.	Cost of Production.	Approx. Daily Cost in Pence.
Potatoes	6	2s. 6d. per bag	1.2
Monkey Nuts	1	½d. per lb.	.25
Mealies	2	4s. per bag	.48
Totals	9		1.93

Adding to this the value of the majordas or melons, it may be taken as costing 2d. per diem.

Ration No. 4.—Alternative to Ration No. 3:—

Food.	Ration in lbs.	Cost of Production.	Approx. Daily Cost in Pence.
Potatoes	6	2s. 6d. per bag	1.2
Skimmed Milk	5	½d. per 10 lbs.	.25
Mealies	2	4s. per bag	.48
Beans	½	10s. per bag	.30
Totals	13½		2.23

Approximately 2¼d. per diem.

Ration No. 5.—For pigs from 6 months old and upwards:—

Food.	Ration in lbs.	Cost of Production.	Approx. Daily Cost in Pence.
Potatoes	8	2s. 6d. per bag	1.6
Skimmed Milk	5	½d. per 10 lbs.	.25
Mealies	3	4s. per bag	.72
Beans	½	10s. per bag	.3
Totals	16½		2.87

This ration is practically the same as Ration No. 4, except that the quantities are increased. It costs a fraction over 2½d. per diem. Pigs fed this ration would require very little water.

Ration No. 6.—Alternative to Ration No. 5:—

Food.	Ration in lbs.	Cost of Production.	Approx. Daily Cost in Pence.
Potatoes	4	2s. 6d. per bag	.8
Pumpkins	4	10s. per ton	.24
Mealies	3	4s. per bag	.72
Beans	1½	10s. per bag	.9
Totals	12½		2.66

In this ration, as also in Ration No. 5, it will be noticed that monkey nuts are not included, the reason being that they would tend to produce oily bacon if fed during the last two months. The cost of Ration No. 6 is also a fraction over 2½d. per diem.

Let us now consider the financial aspect of some of the foregoing rations. We will choose Nos. 1, 3 and 5, as they are collectively the cheapest:—

Assume that a pig at 2½ months old has cost 5s. to produce or purchase	£0	5	0
The cost of feeding him on Ration No. 1 for 45 days, or until he is 4 months old, approximately	0	3	7
The cost of feeding him on Ration No. 3 for 60 days, or until he is 6 months old, approximately	0	10	0
The cost of feeding him on Ration No. 5 for a further 60 days, or until he is 8 months old, approximately	0	13	4
Total approximate cost at end of 8 months	£1	11	11

By this time he should weigh at least 180 lbs. live weight. At the present factory price of 4½d. per lb. live weight, he will realise £3 7s. 6d. Now, £3 7s. 6d., less cost of keep, £1 11s. 11d., less (say) 5s. for railage, crate hire, etc., leaves a profit of £1 15s. 7d., plus the value of the manure which, on granite farms, will more than compensate for the labour of feeding, interest on buildings, etc.

In reckoning the cost of production of food-stuffs, it has been assumed that they will be specially produced for feeding to pigs (except, of course, skimmed milk, which is a by-product). Now, often a crop of potatoes, for instance, may be raised for sale on a cash market. The sale at first may be very satisfactory and perhaps even highly remunerative, but prices may fall away to a very low figure before the crop is all sold. The remainder can then be fed to pigs, and the good cash sales of the early part of the crop can bear an increased portion of the cost of production, and thus render the surplus portion much cheaper as pig feed than our calculations have allowed.

The cost of feeding on Rations Nos. 2, 4 and 6 may be easily reckoned out, and any special or favourable circumstances attending the production of the food-stuffs in individual instances may be allowed for.

In conclusion, the writer would impress upon the reader not to under-estimate the value of the manure on granite farms, especially on farms containing good vleis.

Citrus Industry in Rhodesia.

A DIFFERENCE OF OPINION.

By A. G. TURNER, Government Citrus Adviser.

The following letter has been received from Dr. C. J. Sketchley, Waterfall Farm, Glendale, Mazoe:—

"I see in the current issue of the *Journal* an article on Citrus Fruits in Rhodesia—planting operations—by A. G. Turner, Citrus Adviser. On page 189 he says, 'holes can be dug 2 feet deep and 2 feet 6 inches across. Surface soil to be placed at the roots of the tree to be planted, the lower soil to be used to fill up the hole with.' Mr. Chas. E. Farmer, in an article on the same subject in the April number of the *Journal*, 1913, page 516, says, 'If the field has been thoroughly and deeply prepared, it will be only necessary to dig holes large enough to take the roots without cramping, nor need the hole be deeper than is necessary to take the tap root.' He goes on to say, 'it is a great mistake to disturb the soil beneath the tree to a greater depth than it has been disturbed in ploughing,' and quotes Australian practice, which condemns the digging of holes at all, as they form a drainage reservoir for rain in extra wet seasons, to the detriment of the growing tree. Now here we have two diametrically opposite systems advocated by two Government Citrus Experts, or Advisers, and it is easy to imagine the prospective grower of citrus fruits being somewhat 'fogged' and uncertain which system to adopt in his planting operations, but I must say that if he reads Mr. Farmer's article carefully as above quoted in the *Journal*, he should have no difficulty in deciding which is obviously the better plan. Personally, I know that the hole system was abandoned in California in the 80's. During my nine years' residence there, within touch of Riverside and the great orange centres, the system was to plant after the plough, which they also adopted about that time in planting vines.

"Mr. Turner's article in the December *Journal*, 1914, page 1142, is very much to the point, where he makes it very clear that it is waste of time to plant citrus orchards unless able to irrigate them when required, and unless one can do so, it is very much better left alone; this has common sense and experience on the face of it. Opposed to this is Mr. Farmer's article in the December *Journal*, 1913, page 220, where he says, 'it is not absolutely necessary to have irrigation,' and says, practically, good fruit can be grown on dry lands, given certain conditions.

"Again, Mr. R. McIlwaine, our Citrus Adviser (unofficial) for some years, strongly advocated the possibility of growing citrus fruits on dry lands with intensive cultivation, but I see in the *Journal* of June, 1914, page 705, he has entirely altered his opinion, as is obvious to anyone reading his article.

"Now, Mr. Editor, it is extremely difficult for a farmer who intends planting a citrus orchard to know exactly what to do. With these two Advisers, he is between the devil and the deep sea. Here we have two Government Experts giving advice on the all-important matter of planting a citrus orchard on exactly opposite lines. Which is he to take? There is no doubt Mr. Farmer is absolutely right on the matter of planting, and Mr. Turner is also right in the important matter of irrigation, whereas Mr. McIlwaine admits in his article he has never been right, but, after all, he was only an experimentist, not an expert.

"It appears to me prospective citrus growers are in much the same kind of difficulty tobacco planters were nine to ten years ago, when the Tobacco Experts' advice changed from year to year, as experience proved they were right or wrong—generally wrong. But it is much more serious in the case of citrus growers. Tobacco being an annual, mistakes could be rectified year by year, but citrus once wrongly planted is an established object lesson of misplaced confidence.

"I do not by these remarks wish to reflect on either of these gentlemen. They are undoubtedly good men according to their lights and training. It is the poor misguided farmer who suffers, and not the well and regularly paid Government official expert."

It will be seen by the above letter that Dr. Sketchley gives me credit for being correct in regard to the importance of irrigation, but considers I am at fault with the system of planting I advocate.

With regard to the first point raised by Dr. Sketchley, namely, the method in which orange trees should be planted, I would quote extracts from various authorities in America and South Africa, corroborating the advice given by myself on this point:—

Bulletin on Citrus Culture in California; Research by B. M. Lelong, assisted by experienced Horticulturists; revised by State Board of Agriculture, 1902.

"A great mistake is often made by careless planters in digging small holes, just large enough to crowd the roots into. Into these the trees are forced, the roots being twisted out of shape, with no regard to their proper position, and as a result the trees make a stunted and unhealthy growth. The holes should be both deep and broad. It is best to dig the hole deeper than is needed, then fill up the bottom with a cone of surface soil, and in the apex of this cone a hole is made with a shovel handle to receive the tap root. The laterals are then carefully spread out as nearly as possible in the position as occupied in the nursery, and the hole filled up. The tree should be planted a little deeper than it originally grew, and when it is set should be pulled up with a gentle shaking motion to its proper height. This will settle the soil about the small roots; a bucket of water is now applied, which will still further settle the soil. As soon as the water has disappeared, a little fresh soil is put over the basin to prevent evaporation and keep the tree from leaning. Trees planted with these precautions make the best growth and become the thriftiest."

The following is a quotation, with reference to orange tree planting, from "California Fruits," by Professor E. J. Wickson, M.A. This is recognised as a standard work:—

"The same considerations which require extra care in lifting trees for nursery, rule in putting them in permanent place. All authorities on the subject specify exceptional care in preparing the tree holes as a profitable investment on the part of the planter. Large and deep holes are commended, provided the planting is being done in a deep free soil."

With regard to the above, upon reference to my article which appeared in the December, 1914, issue of this *Journal*, it will be seen that I stated, "suitable soils will be found in red soils, sandy loams and the lighter chocolate loams, provided they are deep and have not clay or ironstone sub-soils, also deep black granite and some lighter grey soils. Turf and clay soils are unsuitable and should not be considered. Whatever the soil is, good drainage is a *sine qua non*, as the orange, like most other fruit trees, must have dry feet."

The following is a description of planting orange trees by a well-known grower on a large scale at Riverside, California, the place mentioned by Dr. Sketchley and where I also lived for some years:—

"The trees are then lifted with large balls of earth, and are taken directly to the plantation, where holes two feet deep and two-and-a-half feet wide have been prepared, into which they are placed, and the earth is walled in around each ball, not firmed, but settled with water, so that the tree will stand at the same height as it did at the nursery."

R. A. Davis, Chief, Division of Horticulture, Union of South Africa, in an article on Citrus Fruits in South Africa appearing in the March, 1914, issue of the "Union Agricultural Journal," says:—

"The principal points to be borne in mind in preparing the land are that it must be (if necessary) thoroughly cleared, deeply ploughed and sub-soiled, cross ploughed and levelled.

"Holes may be dug about two feet deep and two feet six inches across, or occasionally to an even lesser depth. The danger is not in planting two shallow, but too deep. The deeper and more suitable the soil, the deeper the hole may be dug. Holes dug deeply in hard soil with an underlying layer of clay means death to the trees; practically they are not holes, but wells in which water accumulates and stagnates, causing decay of the root hairs first and eventually of the tree. When drainage is good there is less danger on this score. In digging the holes, the top soil should be carefully placed on one side and the bottom soil taken out and placed on the other side of the hole, the bottom of which should be loosened to the full depth of the spade. Planting should be done after the following fashion:—The top soil taken from the hole should be first replaced and brought up into something of a cone shape in the centre of the hole. The roots of the tree should be trimmed with a sharp pair of shears, in order to remove all that may be bruised or broken, and then placed on top of the cone and more soil thrown over them until they are well covered. After this is completed, a little more top soil is put in and water run into the hole. After all the water has disappeared finally, the hole may be filled up with surface soil taken near at hand. The tree should not stand after planting is finished as low as it stood in the nursery by a couple of inches; later on, it will be found that the sinking of the soil will bring the tree to about the same height above the ground as it stood in the nursery."

I think I have quoted sufficiently to substantiate the advice given by me. I would now add that the only time when it would be justifiable to plant in holes just large enough to admit the roots, would be when the trees are sent out from the nursery "balled," that is, with a ball of earth round the roots and held in place with sacking. When planted, the ball of earth and sacking are left intact, but even when trees are planted in this fashion the ground must previously have been *very* deeply ploughed. This is one system of planting still in vogue in California. When orange trees are planted with bare roots in California (and this is the only system employed in South Africa or Southern Rhodesia), the operations are carried out exactly as described in my article in the April issue of this *Journal* by all intelligent planters who know the need of starting a tree well in life. I may say that in the last 24 years I have personally planted many thousands of trees according to the method described by me, in California, Cape Colony and the Transvaal, and have seen many trees that have been planted in Southern Rhodesia in similar manner, and they are all that could be desired. On the other hand, I regret to say that I have seen many planted here in Southern Rhodesia on the plan that Dr. Sketchley apparently advocates, and they are anything but satisfactory; in fact, in the majority of cases they are already dead or doomed to failure, although they have had as good attention as if planted otherwise. This method of planting trees practically on the surface obtains in Florida, but has not been followed elsewhere with success, so far as I have ever known. In this country it would be folly to attempt it, as when the first heavy rains came along, the trees would be standing with roots exposed to the sun, and probably would not exist for one season.

The remark anent the hole system being abandoned in California is incorrect, while the other about the orange trees being planted after the plough, is a system never adopted by growers. In all probability Dr. Sketchley saw some trees being heeled in on arrival from the nursery preparatory to being planted.

Regarding the irrigation of citrus trees, I am aware that Mr. Farmer did not consider it to be essential for a commercial enterprise, but I am convinced he would have changed his opinion after a few more years' residence in South Africa, while I believe Mr. McIlwaine already realises that he was on the wrong tack. With regard to my own opinion, I wish to again emphasise the absolute futility of attempting a commercial citrus undertaking in this country without an adequate water supply.

The Plasmoses of Cattle.

(Extracted from the Annual Report of the Government Veterinary Bacteriologist for the year 1914.)

The plasmoses of cattle have continued to cause enormous losses to stockowners through the serious shortage of bulls, the heavy mortality of young animals, more especially of grade stock, and the anæmia and consequent loss of size, vigour and maturity in all bovine animals directly or indirectly due to these diseases. The indigenous cattle of the country, while comparatively resistant to the plasmoses, are small and slow to mature, and these defects can only be remedied by mating with bulls of improved types. It has been estimated by the Chief of the Animal Industries Branch that at the present time 500 stud bulls are urgently required for this purpose. But the mortality of cattle introduced from overseas for this purpose has been so great as to render importation an extremely hazardous and costly proceeding.

Attempts have been made in the past to elaborate a method of immunising such stock against these diseases, with varying degrees of success. In 1911 Sir Arnold Theiler established a method which, while successful in the Union, was less efficient in this country, and its use had to be discontinued. Our own attenuated virus was then used with partial success, but last year it became exalted in virulence, and had to be discarded. With the discovery of the principles of systematic dipping, it was hoped that the danger of natural infection might be overcome, but it was soon apparent that animals bred on dipped areas, when removed to tick-infested veld, contracted redwater, and frequently died from it. So that, until systematic dipping is universal, its practice is attended by marked disadvantages, in limiting the movement of stock born on clean areas. But although redwater yields readily to regular dipping, anaplasmosis is not so easily eliminated. To confirm practical observations, certain experiments were conducted. Blood was taken from cattle which had been running for different periods on certain dipped areas, and was inoculated into cattle newly arrived from Great Britain, in which it produced no piroplasmosis, but a marked anaplasmosis re-action. In one instance blood from a nine months old heifer, born and running since birth on an area where five-day dipping has been practised under Government supervision for as long as five years, caused no redwater, but gave rise to a severe anaplasmosis, from which the inoculated animal died. It would appear, therefore, that under existing conditions the ideal method of dealing with these diseases is to supplement regular dipping with a simple and safe method of protective inoculation. To obtain such a method, a series of experiments was conducted on twelve Shorthorn heifers imported from Great Britain for the purpose. A first series of experiments was undertaken to discover a specific therapeutic agent against anaplasmosis, comparable in effect to trypan blue in the treatment of piroplasmosis, but, although numerous tests were made with drugs and sera, no success was achieved. A second series of experiments was conducted to discover and test various strains of virus which would give rise to a mild form of plasmoses within the limits of safety, followed by a marked degree of immunity or tolerance. The imported Shorthorn heifers were used for the purpose. Fortunately, with the first attempt, a very favourable virus was obtained, and six of the experimental animals upon which it was used suffered from mild re-actions from which they recovered. These heifers are now being exposed to natural tick infection, which it is confidently believed they will resist. This virus and modifications of it are now being tested on the remainder of the consignment, and, if the favourable results are continued, it is hoped that within the near future the inoculation of imported stock may be undertaken with better results than hitherto.

Breeding Cattle for Beef.

By Percy J. Hensman, Shangani.

Cattle breeding is a most interesting as well as a large subject; especially is this the case in Rhodesia, where it is expected to become the mainstay of the farming community. Everyone realises that Rhodesia sooner or later will have to export her surplus beef; therefore, let us now prepare for that export trade by breeding suitable cattle, so that when the time comes, we shall be fully ready to supply the right class of cattle for the European markets.

How is this to be done? First let us go very carefully through our herds and cull out every beast that is lacking in constitution. Do not sell these brutes to some person who does not know, or if he knows, does not realise that they are worthless; no, we will place them in a good paddock and give them some ensilage, hay, majordas and a little mealie meal, but the moment they are fit to kill, we will sell them to the butcher.

We will now have another look through our herd, picking out all those that are not of the required type. These we will sell to the best advantage, and buy in others of the sort we want, *i.e.*, good roomy young cows or heifers, with plenty of bone and size, a large barrel and a great depth through the heart. Our females having been chosen, we now come to the bulls. Most people say that the bull is half the herd. I go further and say that a pure-bred bull is three-quarters of the herd; therefore, we will buy the very best bulls we can afford, and—this point should be noted—it is not always the highest priced bull that turns out the best.

In choosing a bull, let us look for these points:—He must have a good masculine head with a wide forehead; a smart compact body of medium size (it is best to get size from the female); a well sprung rib; a level top line; well let down behind, and the flesh right down to the hocks; a large barrel and deep through the heart; the hips and shoulders not too strong, and the beast well filled in with flesh behind the shoulders. Having got a general idea of the class of bull we require, we have now to decide the breed that we think will suit our cows and our veld best; whether it shall be the Hereford, Shorthorn, Aberdeen Angus, North Devon or Sussex. Having decided upon the breed to work with, on no account must it be changed until and unless that decision has been proved wrong. How many herds does one see ruined by there being no settled policy carried out! One year a Shorthorn bull is used, then perhaps a Friesland, then some other breed that happens to be recommended, and what is the result?—a lot of mongrels.

Suppose we decide that Herefords will suit us best, let us stick to Herefords, and when a friend comes along and tells us that Mr. So-and-So has Shorthorns or Devons that are doing wonderfully well, do not let us be disheartened and change to those breeds; let us tell our good friend that we have decided on Herefords, and until they have proved themselves a failure, to Herefords we mean to stick.

Hereford, Shorthorn and Aberdeen Angus cattle have each a world-wide reputation as beef cattle, and it is just a matter of fancy and location which to choose; all are good. If we can afford to do so, we should always grade up with pure-bred bulls, as for generations they have been bred to a fixed type, and have thereby such a predominating influence on the resultant calf.

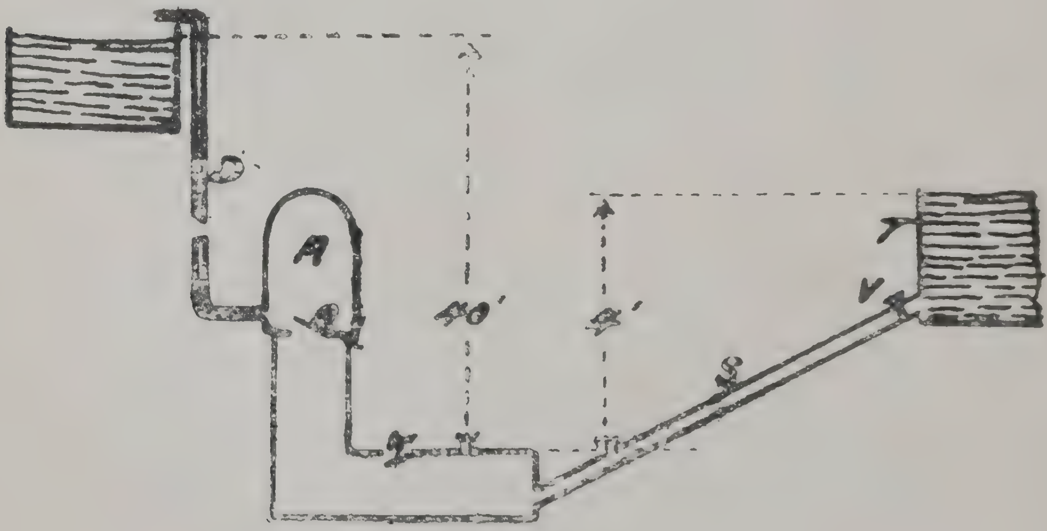
Soon we shall have to consider how we are going to put our cattle on the market in a suitable condition for the Home trade. We want to get the top prices (let us aim high enough), and that in competition with South American and Australian supplies; therefore, our bullocks must be fat. Perhaps it will be necessary to put them on lucerne paddocks for the last eight weeks, or where lucerne is not available, they will have to be finished off by hand feeding; but, whatever we do, let us do it well—it will pay best in the end. One other thing we must be careful about, and that is that no common bull, whether belonging to a neighbour or a native, is allowed to get amongst our herd.

Hydraulic Rams.

By W. Martin Watt, Agricultural Engineer.

On many farms in this Territory the installation of a hydraulic ram for raising water for domestic use might be economically applied. Homesteads are usually erected at a considerable elevation above their water supply, and this necessitates some form of pumping, otherwise the water has to be carted or carried by hand.

Wherever a fall of water is obtainable, either from a running stream, a dam or other source of supply, a hydraulic ram can be operated. The principles of working a hydraulic ram are simple; they depend upon the utilisation of the momentum of falling water.



Looking at the sketch here reproduced, if control valve "V" is opened, the water will fall down the drive pipe "S" and escape at valve "W," until it has attained sufficient momentum, when valve "W" will close. The impulse or momentum of the stream thus attained forces the water through valve "R" into the air-chamber "A" and up the delivery-pipe "D," until this momentum ceases, when valve "W" opens and valve "R" closes and retains this water in the delivery-pipe "D." Again, when valve "W" opens the water rushes down delivery-pipe "S" until it again attains sufficient momentum, when valve "W" closes and a further quantity of water is forced through valve "R" up the delivery-pipe "D." This cycle continues automatically, and in this manner a certain percentage of the drive water is raised to a greater height than that of the surface of the supply water level.

In theory the principle may be explained thus:—If 10 gallons of water fall 10 feet high in one minute, they would be capable of raising one gallon of water per minute 100 feet high, because 10 gallons x 10 feet equals 1 gallon x 100 feet in gallon-feet. Again, if 100 gallons of water fall 5 feet, they would be capable of raising 5 gallons 100 feet, because 100 gallons x 5 feet equals 5 gallons x 100 feet. But in practice these results are not obtainable, as we have to allow for the friction in the drive and delivery-pipes, the slipping and friction of the valves, and the loss of water which is necessary for the operation of the ram. Many makers claim high efficiencies, but in a number of cases these efficiencies are obtained under ideal test conditions, and it will accordingly be as well not to base our calculations on too high an efficiency. The efficiencies of hydraulic rams vary from 25 per cent. to 70 per cent., according to the make, fall, and the ratio of the fall to the lift. This does not include the friction in the drive-pipe, which will vary directly according to its length, and inversely as the square of its diameter. This means that from one-quarter to seven-tenths of the work actually done is usefully performed in the delivery of the water.

Generally speaking, a suitable ratio of fall to lift is 1:10, whilst ratios of 1:4 up to 1:20 are quite workable for most types of rams. Outside of these ratios the rams are more expensive, and for higher ratios are less efficient. Taking a ratio of 1:10 as shewn on the sketch, viz., a 4 feet fall and a 40 feet lift, and with a supply of driving water of 28 gallons per minute, a ram would in theory be capable of delivering 2 4-5ths gallons per minute. The probable efficiency with this ratio would be about 40 per cent., and that means the actual quantity of water delivered by the ram would be about 1 1-10th gallons per minute.

Before ordering a ram, it is absolutely necessary to supply the maker or his agents with the following particulars:—

(1) The vertical fall in feet or inches which is obtainable from the source of supply. This working fall should be measured as shewn on the sketch from the top of supply water level to such a level that escape valve "W" would have a free outlet.

(2) The vertical height to which the water has to be raised above the level of the ram.

(3) The length of the delivery-pipe required.

(4) The approximate quantity of drive water, measured in gallons per minute, which is available. Methods for the measurement of flowing water are described in Bulletin No. 64 of February, 1911, issued by the Department of Agriculture, Salisbury.

(5) The number of gallons it is desired to raise in a day of 24 hours.

(6) The length of supply pipe that is necessary. (This should be kept as short as possible.)

It will be obvious that only in rare instances will all these conditions be the same in each case; for instance, there may be a large quantity of drive water, low fall, and medium lift, and in another case a small quantity of drive water, high fall and high lift, and all other various combinations. Therefore, it is most important when ordering a ram to supply the makers or their agents with full particulars as mentioned above.

Some Household Insects.

By R. Lowe Thompson, B.A., Assistant Government Entomologist.

The question of controlling the common insect pests that infest our houses may at first seem to be a trivial matter. Long familiarity leads us to accept and tolerate them as necessary evils. Many have accompanied man all over the habitable globe; their ravages have no novelty for us; and we do not reckon the cost of their incessant attack, losses of foodstuffs fouled by fly and beetle, clothes ruined by moth, of energy in repelling the loathsome familiarities of the house fly, of sleep due to the attentions of other insects, and lastly loss of life itself. In the latter connection one may recall the fact that three of the plagues of Egypt were of an entomological nature, and two of these come under the heading of this article. Forming, as they did, part of a well-thought-out policy of "frightfulness," the order in which the plagues occur has a deep significance. Thus plague No. 4 was "flies" ; No. 5, "murrain of cattle" ; No. 6, "boils and blains breaking out both on man and beast." Following the example of Moses, I will commence with a few notes on flies, and then proceed to murrain and the unpleasing subject of boils.

The House or Typhoid Fly *(Musca domestica)*.—This is undoubtedly the worst enemy that man has. Numerous experiments have now proved it to be the chief carrier of typhoid and tuberculosis—that is to say, of the most dreaded tropical disease—and the worst scourge of temperate climates. It also conveys dysentery, infantile diarrhœa, Asiatic cholera, and certain forms of ophthalmia. Should any doubt exist as to the danger of its presence in any civilised household, a recent author states:—"Under certain conditions it is very probable also that the house fly may transmit leprosy, erysipelas, anthrax, smallpox and yaws."

The reasons for this are as follows:—The house fly will feed and breed in the foulest garbage that it can find, and it is equally attracted by the daintiest food prepared for man. Unlike other insects, it passes freely in and out of our houses. It emerges perhaps in the early morning to take a light meal on the most contaminated sewage or attractive carrion available, then rejoining the family at breakfast, fulfils its destiny by falling into the milk jug. One is always inclined to wonder, as one fishes it out of that receptacle, what it was feeding on last. Finally, the sticky pads on the feet, the slimy tongue, and the fine hairs of the legs and body, are unrivalled traps for bacilli. In a count taken of 414 flies in New York, the average number of bacilli per fly was one and a quarter millions. Nothing can be said in favour of this insect. As a scavenger—that is to say, as an insect which may possibly benefit man by destroying decomposing matter—it is one of the poorest known, and there are hundreds of other insects that are superior to it in that respect, and do not enter our dwellings to soil our food with their filthy feet, or dump a few thousand bacilli on any sore or scratch with which we may be afflicted. The question is to find the best means of reducing the numbers of this pest, and to do this one must glance briefly at its life history. The eggs are laid in any decomposing material, preferably horse manure. Under warm conditions the white legless maggots emerge in twelve to twenty-four hours, are full fed in four to six days, and then change into brown barrel-shaped pupæ, from which the adult flies emerge in about three days. Under cold or unfavourable conditions the development is less rapid, but in this country the chief control measures must be based on the shortest period in which the maggots can feed up. Within four to fourteen days of her emergence from the pupa, the female begins egg deposition, laying up to three hundred eggs singly or in small batches. From this last fact one may draw the comfortable conclusion that by killing one young female before she starts egg laying, a future brood of three hundred flies is nipped in the bud, and the regular destruction of adults certainly helps as a control measure. But, on the other hand, if there are three hundred flies in a room and one female escapes destruction, and finds a suitable breeding place, there will be another three hundred flies to grapple with in eight to ten days' time. *Control* *measures must, therefore, be based on the destruction of all material in which the fly can breed.* The most important fact in this connection is that *house-fly maggots cannot feed on dry substances;* they must have a certain amount of moisture. The chief breeding places in this country are the open manure heap and the cattle kraal. With our long dry season, one could reduce the number of flies enormously wherever it is possible to enclose stock in paddocks, so that their droppings are spread over a fairly large area, and to spread stable manure, stable litter, etc., thinly over the lands every three days. If this can be done, the manure, etc., will dry up so rapidly that it is no longer available as a breeding place for the pest, while any maggots already present will die of drought. This control method has been adopted with marked success on some ranches in the western and southern States of America. It is stated there that the value of the manure as a fertiliser is certainly not diminished, but if anything increased, by this method. There is, however, one possible drawback to this treatment. The manure as it dries out into thin light flakes may be blown off the lands, where its presence is needed, but this disadvantage depends upon local conditions, and each farmer must use his own judgment in the matter. Needless to say, similar action should be taken every three days in regard to other breeding places, such as heaps of decaying hay or weeds, accumulations in pig-sties, rabbit hutches, or poultry runs, and any waste food either of man or beast. Lack of labour may, of course, prevent a settler from adopting these measures, but at the same time the ultimate control of the house fly must be based on the destruction of its breeding places; and, to emphasise this fact, I may add on good authority that an open manure heap in New York contained as an average over 1,000 fly maggots per lb. No real decrease in the number of flies can be expected when a manure heap or wet cattle kraal is close to the dwelling house. If it is impossible to dispense with them, kraals and refuse heaps should be at least 500 yards distant from the house, since the average flight of a house fly may be estimated at about a quarter of a mile. As an alternative to drying out manure, lengthy experiments have been conducted in the United States and elsewhere in the hope of finding some substance that will kill the maggots. Numerous chemicals have been recommended, but at present these do not seem to be suitable for extensive use in Rhodesia, owing either to the cost entailed, or to the fact that they spoil the manure for use as a fertiliser. The following may, however, be used on refuse not intended for manure, and for ash-bins, cesspools, etc.: Chloride of lime, Jeyes' Fluid, or 1 per cent. arsenite of soda.

Remedial measures for maggots do not, of course, exclude remedies for the destruction of adults that may be a source of danger and annoyance in houses. The use of sticky strings and poisoned baits is familiar to everyone. Two of the latter may be given. The first consists of one part formalin in fifteen parts milk and water. This should be placed in saucers with the addition of some bran or pieces of bread on which the flies can settle, and has the advantage of being practically non-poisonous to man, but the disadvantage of needing renewal every two or three days. The second bait is made by dissolving one ounce of arsenite of soda in a little boiling water and adding it to one pint of brown sugar or treacle syrup. Any tendency to ferment, or grow mildew, may be checked by adding a teaspoonful of formalin. This bait may be placed in jars or tins fitted with a wick of cotton-wool looped over a bar across the mouth of the tin. The bait will soak up through the wick, and if the amount of water lost by evaporation is replaced about once a month, the poison will last about a year. This mixture has, of course, the disadvantage of being poisonous to man. For either bait to be successful, it is essential that all other foods or liquids should be covered up from the flies each night, so that when they take their first meal as they usually do in the early morning, it will be fatal to them. It is also advisable to place the baits near the windows, since flies usually make for the light after sunrise. The attractiveness of poisoned baits or sticky papers may be increased by placing a slice of over-ripe banana or a little dried blood upon them. One may notice here that the arsenite, although it poisons as surely as the formalin, acts more slowly, and a poisoned fly may have time to fly into food, but the amount of poison that it contains will be far too small to injure anyone who swallows the insect. Apart from houses, house flies are frequently very obnoxious in stables. In this connection Mr. F. W. Pettey claims to have controlled them successfully by hanging up branches in the stables, and spraying them every two days with a mixture of arsenite of soda (half-a-pound), sugar (four pounds), and water (four gallons). The branches must, of course, be hung out of reach of the cattle, and care taken that none of the spray can drop on to their food. Mr. Pettey states that a fresh solution should be made up before each spraying, as it loses its effectiveness after two days.

The Stable Fly *(Stomoxys)*.—This insect is closely allied to the house fly, and is very similar to it in appearance; but a close examination will shew that, instead of the soft fleshy tongue that folds up under the head of the house fly, it possesses a thin wiry beak, which projects horizontally in front of its head. Usually abundant in stables during the wet season, it occasionally enters the house and announces its arrival by stabbing its host sharply in the ankle. On looking down and observing what at that distance appears to be an ordinary house fly, the victim usually concludes that the more familiar insect of the two has developed yet another irritating habit. He may then set out poisoned baits given above and complain bitterly that they do not work. They certainly do not in this case, for the stable fly is essentially a blood-sucking insect and is not attracted by them. Sticky papers may catch a few, but with this insect, just as with the house fly, the most important control measure is the abolition of all the material in which it can breed. This chiefly consists of rotting hay and grass, heaps of dead weeds, or stable litter containing a fair proportion of straw. In towns large numbers emerge from any stable refuse that is allowed to accumulate, and also from the heaps of grass which certain municipal authorities allow to accumulate on vacant stands during the rainy season. On farms the main supply comes from stable litter, rotting heaps of hay or from blood refuse. Pure manure does not attract the fly to any extent. Stable fly maggots require more moisture than those of the house fly, and almost complete darkness; nor do they develop so rapidly, the shortest period in which they can feed up being about 11 days. The scattering and drying of all infested matter is, therefore, a particularly valuable control measure. Rotting straw or hay stacks, and all heaps of hay and grass not required for winter feed, should be burnt or scattered over the lands, and if it is necessary to cut the grass on vacant stands in order to deprive the felonious native of a welcome refuge, it would be well to leave the swathes where they fall until the rains are over. No refuse, in fact, in which the maggots can develop, should be left in a moist heap for longer than a week. The suppression of this fly is particularly important to dairymen, since the presence of the flies can lead to marked diminution in the milk yield. In one case during a plague of flies in Texas a decrease of 40 to 50 per cent. was noticed.

This was also the insect that caused the "fly plague" in Zululand in April, 1914. In this instance it appears that heavy floods in March heaped up masses of soaking herbage, which proved ideal breeding places. Hence the plague in April, concerning which the Senior Veterinary Surgeon, Transkei, states:—"So great has been the annoyance and loss of blood caused by these flies, which buzz around in swarms, that all classes of animals have suffered greatly from worry and anæmia. Many cattle have been killed. To obtain relief, horses and cattle have stampeded into the sea and into rivers everywhere."

Many substances have been tested as repellents for these flies, but have proved either too costly or not sufficiently lasting in effect. A mixture of fish oil and paraffin is generally recommended, but only gives temporary relief.

THE SKIN MAGGOT *(Cordylobia anthropophaga)*.—This repulsive pest may be comparatively scarce or disappear almost entirely for several years, and then without warning become an absolute plague, as has been the case during the last two rainy seasons in Rhodesia. Little is known as to its life history, and it is not certain whether the fly lays eggs, or whether, like some of its allies, it deposits living maggots. This point, however, is less important than the question as to when the eggs (or maggots) are laid. From recent information derived from various victims, it seems certain that the fly usually lays on the sleeping places of man and domestic animals, and on woollen underclothing, especially if these are impregnated with sweat, the smell of which attracts the fly. On the other hand, there is little doubt that the fly will sometimes lay directly on the skin of its victim, as is shewn by numerous cases in which babies' scalps have become infested. In one case as many as 60 maggots were removed from one unfortunate infant. Once in contact with the warm skin, the small spiny maggot bores into its host, and after a few days makes its presence felt in the shape of a blind boil, which usually has a minute, and sometimes moist, opening in the centre, through which the maggot breathes, and near which at a later date a small black spot, the excrement of the maggot, becomes visible. At this stage the owner of the parasite usually hastens to squeeze it out, so that the duration of the maggot stage is not known exactly, though it probably remains in the skin for about 14 days. If allowed to grow to its full size, about half an inch long, it falls out of its own accord, hides in the soil or some crevice in the flooring, and changes to a pupa, from which the adult fly emerges in about 16 days. The fly itself is a dull sluggish insect one-third of an inch long, with straw-coloured head and legs and a yellow body with darker brown and grey markings. The obvious remedy is to squeeze out the maggot, taking care to extract it whole, and to wash out the cavity with an antiseptic. For prevention, one may suggest that all woollen underclothing, after being washed, dried, and then ironed, or on being taken off at night, should be wrapped up or placed in some receptacle so that the flies cannot get to it; that beds should be covered by a mosquito net while being aired in the daytime; and that babies in particular should be protected from the attacks of the fly by a thorough screen of mosquito netting and by ironing their clothing before use. The fly also attacks domestic animals, and any dogs, etc., living in or near one's house should be examined at frequent intervals, and all dog kennels and rabbit hutches should be cleaned out at least once a fortnight.

The Congo Floor Maggot.—This is closely related to the skin maggot, but with this insect, the maggots do not enter the skin, but hide in the soil or in crevices by day, emerging at night to seek the blood of human beings, after the manner of bed bugs. Europeans are not likely to suffer from these insects, but they are often present in the boys' huts, when the natives sleep directly on the ground. If the boys' beds are raised even a few inches from the floor, the attack ceases, since the maggots are unable to climb. If this is not possible, the floor of the huts should be soaked with a solution of about one ounce carbolic acid in a gallon of water, Jeyes' Fluid, or (better still) with paraffin. This should be done at intervals of ten days for about six weeks. It is not advisable to use dip or an arsenical poison for this work, since particles of poisoned soil may get mixed with the boys' food and prove injurious to them. The adult flies resemble those of the skin maggot. According to recent investigation in the Sudan, they lay 30 to 80 eggs in the soil, the period of egg-laying extending over 4 to 5 weeks. When fed regularly, the maggots pupate in a fortnight, though they can exist for as long as a month without food. The flies may emerge from the pupa under warm conditions in 11 days, but under winter conditions, at Salisbury, the pupal period was from 5 to 6 weeks. The only method of dealing with adult flies that can be recommended at present is to "swot" them. A very useful weapon for this work can be made by tacking a strip of wire mosquito gauze on to a short wooden handle. The gauze should be doubled at the sides and folded over several times at the tip to give it extra weight. The advantage lies in the fact that, whereas an ordinary handkerchief or folded newspaper generally blows the insect away before it is hit, the mosquito gauze allows the air to pass through and the insect receives the full benefit of the blow.

In this connection one may note that we have many species of dingy yellow flies, which sit idly around in the darker parts of our houses, and resemble skin and floor maggot flies very closely. Their habits are not known, but the larvae are probably scavengers, for if they attacked man, they are so common that none of us would escape. There is no reason why these should not be killed when possible, but their common occurrence is mentioned lest nervous householders become unduly perturbed by their presence.

Flesh Flies.—Under this last heading may be included a number of blue, green, or grey flies which resemble one another in their habit of laying eggs, or, in the case of the grey flies, living maggots, on any flesh that they can reach. There is no need to describe these flies, but should any reader be unacquainted with them, he has only to expose a piece of putrid meat for a few minutes and they will arrive. Everyone knows also the extraordinary rapidity with which a piece of "fly-blown" meat decays, a rapidity due to the fact that the maggots exude a peculiar solvent which is about a hundred times more rapid in its action than our own gastric juices. Their presence is recognised in Rhodesia by the acceptance of the fact that all meat must be stored in fly-proof safes. In using these it is best to hang the meat in them, for in some cases where it has been laid on the shelves, flies have been known to push their eggs through the gauze, and the maggots from these eggs contrived to reach the meat by crawling along the shelf. One English naturalist states that he has seen a "blue-bottle" sit on the top of the safe and drop its eggs through the gauze on to the meat below. This needs confirmation, but it is easy to guard against such a possibility by covering the top with wood or a sheet of metal.

If safes are not available, as is sometimes the case when one is travelling, meat, etc., should be kept in fly-proof tins or in paper bags. It is even sufficient to wrap meat in a sound newspaper if the edges of the paper are folded over several times and securely pinned. The parent fly seems to know that her young maggots cannot penetrate paper, but if there is the smallest tear or pinhole in the paper, she will find it and the maggots will be there.

Where meat is too far gone for human consumption, it is best to burn it. This is better than burying it, for experiments in which maggoty meat has been buried shew that flies emerging from it have managed to make their way through two feet of soil, while one pushing young "green-bottle" actually burrowed through six feet of loose sand. House flies have burrowed through three feet of soil. This is why in Rhodesia the mere burial of material infested by house flies, flesh flies or stable flies is not advisable. Our soil is either sandy, in which case a high percentage of flies can work their way through, or it is a more compact clayey soil, which usually cracks extensively in the dry season and gives some of the insects a still easier way to the surface. If such pests are buried, some may escape. If they are burnt, none can. If the material in which they breed is spread out so that it dries at once, as it should do in this "land of sunshine," they cannot breed in it at all.

Poultry Keeping for the Rhodesian Farmer.

By Frank Sheppard.

With eggs at their present high price, it is a great temptation to many of us to use all our eggs for market purposes and delay our hatching to some future date when the price is lower. Although this practice appears at the moment to be the more profitable, it is usually not the case in the long run. Light breeds hatched now should be fully developed and laying before the rains set in at the end of the year, when the price of eggs will again begin to rise, and these early hatched birds, if properly housed and fed during the wet season, should give a good account of themselves when the adult stock is moulting. Again, it is well known to all of us that our late hatched birds make very slow progress towards maturity during the wet months, and therefore require to be fed on their chick food, which is usually more expensive than that of the adult birds, for a longer period than the early hatched chicks. The cost of rearing them to maturity is, therefore, greater. Healthy, well-grown young stock is better able to withstand the attack of disease than younger birds, and as the advent of the rains usually brings colds and roup to so many birds, chiefly owing to unsuitable houses, it is advisable that towards the end of the year all our young stock should be well grown and able to care for themselves when the rains set in. Heavy breeds in particular, which take longer to mature than light breeds, should be hatched without delay. August and September hatched birds, which we expect to come on to lay in January and February, often make a very unsatisfactory start, but even these, if properly housed and fed, will do better than their more unfortunate sisters, which have to spend so much time during the rains huddled together in some sheltered corner, or under a bush. Those of us who intend exhibiting birds at next year's shows in the cockerel and pullet classes, will find early hatching a great help towards success, as in these classes size and development are qualities which will not be missed by the judges.

With regard to the management of incubators, the novice should carry out the instructions issued by the maker of the machine, until he finds any improvement can be made, owing to local and climatic conditions. There are one or two important points which are often ignored by the operator, although given in the instructions, and which greatly affect the result of the hatch. The incubator should stand on a firm and level base. In hot water machines, see that the wire rod, which passes through the water tank, rests on the centre of the capsule, and that the top fits exactly into the adjusting screw. The incubator must not be jarred or shaken, and great care must be taken in handling the drawer when turning the eggs. When re-filling the oil tank and cleaning the lamp, do not place it on the same table on which the egg drawer is placed when airing the eggs. Oil tins and lamp cloths should not be kept close to the incubator. Do not use eggs more than a week old in the incubator. Those more than a week old should be hatched under hens. It is advisable to change the position of each egg in the drawer a few times during the hatch. Their position will probably be changed once or twice when they are tested, but it should be done more often. If the eggs under a hen are marked with distinctive marks, it will be found that their position in the nest is changed many times during the course of the day. The eggs should be tested for infertility on the seventh and fourteenth days. No elaborate means are necessary for testing the eggs. A hole a little smaller than the egg cut in a piece of cardboard and held against an ordinary lamp will be found quite satisfactory; but if it is intended to study the growth of the embryo thoroughly, a stronger lamp and a darkened room will be needed.

It is impossible to name the most suitable position for the individual to place his incubator, as no two homesteads are similar. It should be placed free from draughts, and in a room with as even a temperature as possible. I recently saw an incubator working in a hut on a small table placed immediately behind the door. Each time the door was opened wide it struck the table and considerably jarred the incubator. This position in the hut, which contained two windows, was said to be the only place free from draughts, but under the circumstances, I would much prefer the draughts to the constant vibration to which the incubator was subject. If an incubator of large capacity is used, and, owing to scarcity, it is unable to be filled with eggs not less than one week old, it will be found satisfactory to place a small partition across the centre of the egg drawer and fill the front half of the drawer first; then, say, a week after, the back half should be filled. Although the partition is not required during the period of incubation, it will prevent the chicks, when hatching out in the front half, from walking over and soiling the eggs in the rear portion. When the first batch has hatched out, and all the remaining shells removed, that portion of the tray should be cleaned as much as possible, and the remaining eggs may be given the whole surface of the tray. This can also be carried out with hot air machines fitted with glass fronts, but the partition is not so important, as the chicks in the front portion, when hatching out, will make towards the light at the front of the machine, and fall through into the drying chamber below. Very few will scramble over the eggs at the back of the drawer, and they will not be badly soiled. A wire or cord should be placed between the two batches of eggs, and fastened to each side of the drawer, and also in the centre. This will prevent the rear eggs rolling amongst those in the front portion, while the chicks are hatching out. When once the eggs have started to chip, the drawer should not be opened more than is absolutely necessary. With a large hatch the chicks will be somewhat cramped in the drying box of most hot water machines. When this is the case, and the chicks are seen to be gasping for breath and placing their heads close to the grating at the back of the box, the lid should be raised slightly at the back, to enable more fresh air to enter, and to give the chicks more head room. The chicks do not require food or water for the first thirty-six hours after they are hatched. They should then be given a feed of hard food sprinkled over with fine grit. Coarse oatmeal, or one of the imported chick mixtures, preferably the latter, is the most suitable food we can obtain in Rhodesia. The hard food should be continued for six or seven days, and should always have a little finely cut up fresh green food mixed with it. The water should be changed frequently during the day, and should never be allowed to become warm. If the chicks are without water for any length of time, and then drink to excess, this is likely to cause bowel troubles. Drinking warm water will have the same effect.

The chicks will probably not take to the soft food readily at first, and should be brought on to this diet gradually. On the fifth day, one meal should consist of the soft food and hard food mixed, and be placed in a small trough. On the sixth day, two of their meals may consist of this mixture, and on the seventh or eighth day it will be found that they will take to the soft food alone quite readily. If they do not appear to take the first feeds of hard food a few grains should be sprinkled on their backs, and these will soon be picked off. Clean cold water should be given at the same time as the first food.

In Rhodesia we do not require hot brooders to rear our incubator hatched chicks. A type of home-made fireless brooder which I have found most satisfactory was illustrated and described by Mr. C. C. Girdlestone in his article on poultry in the April, 1914, number of the *Agricultural Journal*. This brooder is 5 feet long by 2½ feet wide, 2 feet high at the front and 2 feet 4 inches at the rear. The brooder is divided into two compartments. The inner chamber, where the wooden box is placed, is fitted with a floor which is covered with chaff. The outer chamber—the right-hand side one in the illustration—has no bottom. The partition between the two chambers is provided with a small door hinged at the bottom, which, when open, serves as a ladder from the outer chamber to the inner. The floor of the inner chamber is three inches above the ground, and is always dry if the brooder is used during the wet season. The brooder boxes are entirely separate from the brooders, and vary in size according to the number of chicks they are required to hold. The brooder box, which is provided with ventilation holes cut close to the top, and contains small pieces of zinc to round off the corners, is lined with soft hay. As soon as the chicks are dry and old enough, they are taken from the drying box of the incubator and placed in the brooder box, which is then placed in the inner chamber of the brooder. This must not be done till the day is well advanced and the sun has warmed the brooder, which must be turned with the back to the wind. On placing the box in the inner chamber of the brooder, the door is opened and the chicks are allowed out, food and water having been placed ready. For the first two days they are confined to the inner compartment, and on the third day the door in the partition is opened, and they are given the run of the outer chamber also. The food trough and water vessel are then removed into the outer compartment, wherein is also placed a spadeful of earth, which provides them with soft ground for scratching. At about six days old, a wire run is placed at the end of the brooder, into which the chicks are allowed, as shewn in Mr. Girdlestone's illustration. One or two old sacks or grass must be placed on the wire run to shade the chicks from the sun, and if there happens to be strong winds when they are first allowed access to the run, some shelter must be provided at the side of the run on which the wind is blowing.

It will be found necessary at first to return the chicks to the brooder box at night by hand, and if the nights are at all chilly, as will probably be the case at this time of the year, it is advisable to remove the brooder box each evening into a warmer place, returning it to the brooder in the morning when the air is warm. The lid of the brooder box, which should not be attached thereto, should have a piece of flannel tacked on, which will hang down close to the backs of the chicks when asleep. This may be removed when the chicks are growing, and after the first week or so the box may be left in the brooder each night. As the chicks develop, the lid of the brooder box may be left off at nights, and some protection placed against the wire front of the inner chamber of the brooder. At the age of three weeks or a month, the chicks may be removed from the brooder into larger and more airy quarters.

When hens are used for hatching purposes, it should be seen that they are thoroughly clean and healthy and free from vermin. The reason of many hens appearing unreliable sitters and deserting the nest, is owing to the irritation set up by vermin. When setting a broody hen, it should be well dusted with insect powder, and placed on the nest containing one or two pitchers (china eggs) or dummy eggs for two or three days to enable her to become thoroughly broody before being given the sitting. When the eggs are placed in the nest, she should be again dusted with insect powder. The construction of the nest is not the least important point to be thought of with regard to a successful hatch. Earth, well damped with a disinfectant, should form the bottom of the nest, which should be made of soft hay; the corners must be well filled in to prevent any eggs rolling away and becoming chilled. It should be well dusted with insect powder, and the addition of finely powdered tobacco leaves will help to keep it free from vermin. The hen and nest should be again treated with insect powder a day or two before the eggs are due to hatch out. Sitting hens should be removed from the nest at the same time each day, and fed and watered. They should also have access to a dust bath, which they will usually make good use of. My experience of hatching with native fowls is somewhat limited, as I have only two. These I allow to sit just wherever they want to, and to leave the nest at any time they like, and I have always found they give a very good account of themselves as sitters. Their chicks I rear in the brooders with the incubator hatched chicks, as I always endeavour to set one or two hens at the same time as I start up an incubator.

There are no means of telling beforehand whether a broody hen will prove a reliable sitter, except, of course, through previous experience with the individual bird; but there is one test that is worth consideration when there are more broody hens to select from than are wanted for sitting. If the hand is placed flat under each hen while on the nest, it will be found that she will, by movements of her body, endeavour to move the fingers into a comfortable position, presuming, no doubt, that they are eggs. It will usually be found that the birds which are the most energetic and apparently painstaking in these movements will prove the most satisfactory sitters. This experiment should be carried out when it is dark, as unless the birds are thoroughly broody, they will probably resent any interference during the daytime.

Eggs hatched under hens should be tested for infertility just as those in the incubator are tested. If possible, it is advisable to set a number of hens at the same time. When the eggs are tested on the seventh day, and infertiles removed, the sittings should be made up to their required number with the eggs from one or two of the hens, and these may be given fresh sittings. In some countries, chiefly in France, turkeys are used extensively for hatching hen eggs, and there we find on some of the poultry farms large flocks of turkeys kept solely for this purpose.

The sitting hens should be visited and removed from the nest at the same hour each day, preferably in the morning. If they are not removed for some time after their accustomed hour, they are liable to get restless, eggs may be broken and the nest may be fouled. When this has occurred, all the remaining eggs should be washed clean with warm water, and the broken egg shells and soiled hay removed. When hatching with native fowls which are sitting in odd corners, it is also advisable to pay frequent visits during the period of incubation, and the use of insect powder on the bird and nest will be found beneficial. In the early stages of the hatch, the birds should remain off the nest from five to ten minutes, and in the later stages from twenty minutes to half an hour. Sitting hens should be placed away from the other fowls, as there is always a likelihood of another hen laying in the nest—they should be kept quiet and not disturbed.

In choosing a site for the breeding pens, it must be remembered that fowls—pullets in particular—are of a highly nervous disposition, and they should be placed where there is no likelihood of their being frightened by any unusual occurrence, such as a sudden stampede of cattle or loud noises. On many large egg farms in Australia a small fee has to be charged to those who wish to inspect the plant on holidays, when visitors are most numerous and somewhat rowdy, and three days after these occasions there is always a marked decrease in the egg yield.

Cattle should not be permitted to graze in the vicinity of the breeding pens, or, in fact, near any wire netting, as if a horn is caught in the netting very short work will be made of that side of the pen. My own experience in this respect has been with small Kerry cattle, and I can well imagine the havoc wrought by a large trek ox which discovers he is trapped in the wire.

When a contagious disease, such as roup or diphtheria, breaks out amongst a flock or pen of birds, there are many poultry keepers who do not appear to realise that if the time at their disposal for attending to these birds is limited, it would be better spent in checking the spread of the disease rather than attempting to cure the few worst cases. A case of this nature came to my notice lately. A flock of about thirty recently imported birds were suffering from roup and diphtheria. Before I saw the birds two or three deaths had occurred. At the time the three worst cases were penned up separately and were receiving every attention, but the remainder of the flock, consisting of many other cases in various stages of development, and apparently healthy birds, were still running together without any attempt having been made to check the disease. They were obliged to sleep in the open with no shelter whatever, which was no doubt the chief cause of the colds and roup, and the drinking water had not been treated with permanganate of potash or any other disinfectant. In all cases similar to this the most important work to be done is to check the spread of the disease, not to cure one or two of the birds.

Importers of poultry from England cannot fail to have been interested in the manner the birds change their moulting season to suit the conditions in Rhodesia. To those who have no experience with English birds, a few remarks on the subject will perhaps be interesting. The moulting season in England is from, say, August to November. Two pens of pullets and two cockerels, a heavy and a light breed, imported in October, 1913, did not moult the following January or February when the local birds did, but laid well through the whole of the wet season, and commenced a partial moult the following July, which slightly affected the egg yield. They again moulted fully last January. Three pens of pullets and three cockerels imported last November, are now passing through a partial moult. The pen of White Wyandottes, which have only laid moderately since the beginning of the year, are now improving, and the two pens of White Leghorns, which laid well all the wet season, and went off slightly in April, are now (May) improving.

The World's Cattle.

BRITISH INDIA LEADS IN NUMBERS.

Authorities from time to time essay to frame estimates which give the stocks of the principal cattle-owning countries in round figures (says a writer in the London "Times"). One of the most recent of these places the total number of cattle at 448,000,000, of which no fewer that 108,000,000 are allocated to British India, 71,000,000 to the United States, 47,000,000 to Russia, 29,000,000 to Argentina, 25,000,000 to Brazil, 21,000,000 to Germany, 18,000,000 to Austria-Hungary, 14,000,000 to France, 12,000,000 to the United Kingdom, 12,000,000 to Australia, and 7,000,000 to Canada. In considering these figures, allowance must be made for work and dairy cattle. Thus, in the case of British India, a very small proportion would fall to be enumerated as beef cattle, and in such countries as Denmark very substantial deductions would have to be made for dairy cattle. The world's total of beef cattle may be placed at, approximately, 300,000,000. Of these, the United States is estimated to possess a proportion which, if the size and type of the animals be taken into account, would represent one-fourth reduced to terms of beef.

Figures which would shew whether the world's herds are increasing, and, if so, by what percentage, are not available, but there are few authorities who venture to hold that, on the best shewing, the numbers have been more than maintained for a number of years past.

It has long been an accepted axiom that population is one of the factors which determine the number of cattle in any country. It is obvious that, as population increases, more cattle will be necessary, and it is true that up to a certain point the herds increase with the population. But then comes the time when the population is so dense that the available land must be utilised for the raising of the most profitable food products, and pasturage has to give place to cultivation. Consequently, as the population increases beyond that point the number of cattle *per capita* declines. But this cannot be accepted as an invariable rule, although it may be near enough to the mark as regards beef cattle. In Denmark, with its dense population, the number of cattle *per capita* is estimated at 83, which is much larger than that of any other European country, but that is easily acounted for by its pre-eminence in the dairying industry. On the other hand, South America and Australia top the list, because they have huge areas of land which meanwhile can be turned to profitable account by cattle-raising alone. Argentina can boast of 4.27 cattle *per capita;* Australia comes next with 2.40, Brazil with 1.46, and Canada with .98. As regards density of cattle, Belgium comes first with 164 head per square mile. Denmark comes second with 144, the Netherlands follows with 135, Germany has 99, and the United Kingdom 97, Argentina 26, the United States 23, Brazil 9, Australia 4, and Canada 2.

Cows Wanting Salt.

The large percentage of salt that is drained out of the average dairy cow's system in the milking is a point that escapes the attention of many dairy farmers. The inventor of the Babcock milk tester published the results of trials with regard to the giving and withholding of salt in the dairy feeding of milking cows. It was found that if salt was absolutely withheld the effects were shewn within from two to three weeks, and that even while exceptional instances went longer without ill effects, yet sooner or later the animals developed a decreased milking yield, and generally a lower state of vitality.

These effects were worse at calving time, or immediately after, and also in the heaviest milk-producers. The need of salt was further found to be greatest in the case of cows fed mostly in the cow-house, and least among those kept principally on pasture. The outcome of the tests indicated that on the average milking cows required not less than 2 ozs. daily in their food, and the conclusion come to was that cows in milk, when outside, should have access to rock salt as a lick, and when indoors the 2 ozs. per cow per day should be mixed in the food in the ordinary granular form.—*Elder's Review.*

Correspondence.

HORSESICKNESS—EQUICURA.

To the Editor,
Rhodesia Agricultural Journal.

Sir,

Are horse owners in this country aware of the fact that they can save the lives of their horses by using "Equicura"? If not, the sooner the value of this precious medicine becomes known the better. I have in the past lost three horses through horsesickness, and although this has been an exceptionally bad year for sickness, I have cured three valuable horses of my own during the last two months, as well as two of my neighbours' horses, by using "Equicura" strictly according to the directions accompanying each box of six powders.

Each of the above-mentioned cases was *bona fide* horsesickness, and with regard to at least one instance, my near neighbours, Messrs. J. H. Jeffreys, T. B. Hulley and B. L. King, can confirm my opinions. During my absence for three weeks from Umtali they continued treating a horse for me, using the "Equicura" left for the purpose, and although this animal had a temperature of 106.4 and could scarcely see, head very much swollen, and shewing all the usual signs of extreme horsesickness, they very kindly persevered, and his life was saved, undoubtedly with "Equicura."

I need not go into details with regard to each of the five cases under my own experience, but consider this "muti" should be more widely known throughout Rhodesia.

This medicine might be better known than I imagine, but I can only say that I had never even heard of it until it was recommended to me very strongly by Mr. A. W. Strickland of Inodzi farm a few months ago, and had I neglected to take his advice, I am morally certain my three horses would have been missing from my stable ere this.

I am not growing this stuff, unfortunately, nor did I invent it, and have no interest whatever in its manufacture beyond wishing that every lover of horses and also mules should have the satisfaction of seeing their animals pull through this hitherto so-called incurable sickness, by simply using "Equicura" so soon as a temperature is noticeable.

I am, etc.,

P. C. RUTHERFURD.

Whareiti, Umtali,
13th May, 1915.

PREVENTION OF SOIL EROSION.

To the Editor,
Rhodesia Agricultural Journal.

Sir,

With reference to your Bulletin No. 300, "Prevention of Soil Erosion," through experience I find that in ploughing lands on a slope, or in vleis, if the land be started from the middle and continued from the middle on both sides, it leaves the land higher in the middle and also leaves the last furrows high on the outside, thus keeping the water in the veld that would otherwise run on to the land; this should be done along the contour. Land should always be planted along the contour. I also find that if paspalum grass is planted in vleis it grows very thick, and is one of the best grasses for winter feeding, as the moisture in the vleis keeps the grass green all through the winter, and stock will not tramp it out, and I find that pigs are very fond of the roots. Hoping this may be of use to others,

Yours, etc.,

W. CORMICK.

Tendele Estates, 19th April, 1915.

(The matters mentioned in the foregoing were referred to in pages 10 and 11 of Bulletin No. 300.—Ed.)

Departmental Correspondence.

Under this heading we publish correspondence between farmers and the technical officers attached to the Department of Agriculture, containing information which may be of interest and assistance to our readers.

OIL SEEDS.

The Assistant Agriculturist and Botanist: Your enquiry *re* machinery for shelling castor beans has been referred to me. There is no satisfactory machine on the market at present. The beans are, however, occasionally shelled very satisfactorily by a hand maize sheller, the beans being first well dried in the sun. A certain amount of winnowing is subsequently necessary. I myself have successfully used a small "Hawk" maize sheller, removing the outer detachable clamp, and replacing it with some softer material.

WINTER WHEAT.

The Assistant Agriculturist and Botanist: The best wheat for winter sowing in Rhodesia is undoubtedly Early Gluyas. . . . Seed should be sown at the rate of 60 lbs. per acre broadcasted, or 40 to 50 lbs. drilled. Thus 4½ bags of seed will be required for 15 acres broadcasted.

KAFFIR CORN.

The Assistant Agriculturist and Botanist: The best time to cut kaffir corn for ensilage is when the seed is beginning to set in the heads, *i.e.*, about four to five weeks' time after the heads appear. If the stalk borer threatens to become troublesome, kaffir corn should be cut at once.

FURCROYA AND SISAL HEMPS—VLEI LAND—BANANAS AND GRAPE VINES.

The Assistant Agriculturist and Botanist: Furcroya is a sturdier growth in Rhodesia, and will, I think, give the heaviest yields and best returns. . . . The land needs to be ploughed the deeper the better—preparatory to planting.

In the vlei land you mention, I do not think, from your description of it, that you can do better than to get it planted out to paspalum, with *Phalaris bulbosa*, should you desire, in the drier spots. Some difficulty is sometimes experienced with paspalum on account of the indifferent germination, but a bed might be planted with this seed, and the seed transplanted later to the vlei. They can be transplanted at any time during the summer, and the bed can be sown at any time of the year, provided water is available for irrigation.

Both bananas and grape vines grow readily in Rhodesia. Cuttings are best obtained from nurserymen in the Union.

MOULDBOARD *v.* DISC PLOUGHS.

The Assistant Agriculturist and Botanist: A report appeared in the *Rhodesia Agricultural Journal* for December, 1914. . . . The working capacity was not tested, but it is generally agreed among farmers that a disc plough will do a little faster work than the mouldboard, and can be employed with less traction.

LINSEED AND BUCKWHEAT.

The Assistant Agriculturist and Botanist: It is best not to cut immediately the first pods appear ripe, but to wait until the majority of the pods are fit for cutting. At this stage it will be found that the lowest pods are still green. After cutting or pulling and tying in bundles, the crop should remain on the field for a few days, during which period the green pods will have time to mature. In this way the maximum yield of mature seed is obtained.

Frost will certainly kill buckwheat if it occurs before or during the flowering period. Once the flowering stage is over, however, there is less danger from frost. Buckwheat is essentially a summer crop, and should, as a rule, not be sown later than about the middle of February.

CITRUS FRUITS—SEEDLING TREES.

The Citrus Adviser: I would advise you to procure the best seed you can. The seed used in propagating citrus trees should be selected from healthy and vigorous trees, and small immature seed should be discarded. Careful selection in this matter will do much towards procuring strong and well-developed stocks. The seeds should be sown in beds in July or August, and particular care must be taken that the seedlings do not dry out. On the other hand, do not drown them.

I think there is not much doubt but that the rough lemon and Mazoe lemon are identical . . . but unless you can obtain seed from the fruit of Mazoe lemons that have been cultivated and otherwise cared for, I would suggest that you do not use them, but rather buy some rough lemons from the Transvaal, where they can be purchased very cheaply in the winter, when you could extract the seed.

THE BUDDED TREE.

The Citrus Adviser: You should certainly grow your young orange trees to one dominant growth. As the bud continues to grow, it should be loosely tied with soft twine or rope to a stake driven alongside; by this practice the tree will grow straight and symmetrical. At 18 to 24 inches its desired head can be formed from three or four growths, which will be the foundation for the future tree; four leaders are sufficient, and often three well balanced are better. No growth should be allowed below this head, and as the wood begins to harden up, growths are better removed with a sharp knife than by hand rubbing, as by the former method no others will grow where so cut, and the cut, being made clean, will give the tree a smooth body. By the latter method, the trunk generally becomes rough, and suckering gets much greater.

FOOT ROT.

F. J. C., Livingstone, wrote: Within the last two months I have lost two of my best grape fruit trees and an orange tree. These have borne well in the past, and are about ten or twelve years old. They have been irrigated regularly, but one of the former being near a water standard, I was afraid it got too much; this, however, would hardly apply to the other tree. I find also a naartje tree, same age, is beginning to look bad. These have also been sprayed with soft soap, paraffin and tobacco, weak solution, and occasionally opened at the roots and manured with cow dung from a kraal. The bark around the base just about the surface seems to peel off for some reason, which I scarcely think is the result of opening the roots and manuring, as this has been done to several others which are bearing and in a perfectly healthy state.

If you would give me any information as to cause and preventive measures I should be exceedingly grateful.

The Citrus Expert: I shall be glad if you will send me a fuller explanation of your trouble. At the same time I have not much doubt from what you do say that the trouble with your trees is *mal-di-goma,* or foot rot, which would be rather assisted by your manurial treatment, while the spraying would not alleviate the trouble in any way.

The treatment for foot rot consists in improving conditions generally conducive to the health of the trees. Carefully remove the earth from about the tree, avoiding injury to the healthy parts of the tree and roots; with a sharp knife cut away all diseased tissue down to the healthy wood. Burn the material removed. Leave the wounds thus made open for a few days, and if there is any exudation of gum, cut further into the wood, and continue this process until exudation ceases, then paint the surfaces with crude carbolic acid mixed with water in equal parts, and sprinkle the surrounding ground with same solution. Fill in the hole with clean fresh soil. Disinfect tools used around diseased orchard with carbolic acid before using among healthy trees.

I shall be interested to hear from you further.

F. J. C. wrote further: I beg to thank you for your letter in connection with my citrus trees, and now feel certain that the trouble is foot rot. The trees that have died evidently from the disease I have had burnt. Would you recommend painting the base afterwards with Stockholm tar? If you would kindly advise me what preventive measure to take in the future, I should be extremely glad, as I have a valuable orchard of Washington Navels, etc., on one of my farms 18 miles from here; and, while on this subject, would you tell me if in growing Washington Navels it is advisable to grow no other variety in the same orchard? Since opening these trees I have noticed no exudation of gum taking place whatever, and in recently planted trees I have been careful not to plant deeply.

The Citrus Expert: With regard to the various troubles with your orange trees, I take it that you have done as suggested in my previous letter. It might be advisable to disinfect the ground from which you grubbed out the dead and dying trees with quicklime, and if you prefer it you can use coal tar to apply to the diseased parts instead of carbolic acid and water. If you are sure the wounds have healed up and shew no more signs of gumming, it is advisable to paint them over with some good paint.

You are not likely to be troubled with this particular disease with the Washington Navels you speak of on your other farm, provided they are budded on rough lemon, as in all probability they are, and you have taken care to plant them with the union well above the ground. If you are growing Washington Navel oranges commercially you should certainly grow them quite separately from any other varieties of orange, lemon or grape fruit—that is to say, they should be planted sufficiently far away from any other citrus trees to avoid any possibility of cross pollination.

The Agricultural Outlook.

The veld everywhere is in good condition, and there should be ample grazing in most parts of the Territory, provided grass fires are kept under control, to carry stock over until the rains arrive.

Cattle and small stock are generally thriving, and, with the exception of sporadic outbreaks of African Coast Fever in Mashonaland, disease is conspicuously absent. Horsesickness has exacted a terrible toll throughout the country, but with the arrival of the cold weather it is now abating. A large area of vlei land has been planted to winter crops, and there is every prospect of good harvests. In the Victoria district in particular winter cereals are being grown extensively, and there is a large acreage under wheat. It is not necessary to refer to the maize harvest, for figures are given elsewhere which foretell fairly accurately what the crop is likely to total. Natives have reaped fair crops of grain, and should have plenty of food during the winter season.

The Oil Factory is now in working order, and oil seeds will be bought at the prices mentioned in the circular issued by the Acting Commercial Representative. No reliable figures are obtainable as to what the oil seed crops totalled, but a considerable acreage was sown last season to these crops, and from what can be gathered, they have done well, more particularly ground nuts and sunflowers. In regard to the latter, we are informed that both varieties will be purchased by the Factory. In the Hartley district on one farm 60 odd acres were sown to castor beans, and a good yield is expected. The Bacon Factory continues to work satisfactorily, and could dispose of much more bacon than is being cured. For a reasonable expansion of the industry a much larger number of pigs than is now being sent in is required, and it is to be hoped this difficulty will be obviated in the near future.

Wanted.

The following numbers and indices of the *Rhodesia Agricultural Journal* are out of print, and have been enquired for by a reader, who is willing to pay 5s. each for them :—

Vol. I.—Nos. 5 and 6, plus index.
Vol. V.—Index.

In addition to the above, the following have been enquired for :—

Vol. I.—Nos. 2 and 6.
Vol. II.—Nos. 1 to 3.
Vol. III.--No. 1.
Vol. IV. – Nos. 1 and 4.
Vol. V.—No. 2.
Indices to Vols. I., II., III. and V.

If any readers have any of these *Journals* and indices in their possession, and do not require them, we shall be very pleased if they will kindly send same to the Editor. If it is desired, they can be exchanged with any they may have missing, if available.

Veterinary Report.

March, 1915.

AFRICAN COAST FEVER.

Salisbury District.—One case occurred on the infected farm Epworth.

Melsetter District.—On the farm Nooitgedacht a severe recrudescence occurred; 36 head succumbed, due, it is thought, to the herd being allowed access to the badly infected veld. Two deaths also occurred in the native herd on the farm. A decided abatement of the disease occurred on the farm Clearwater, the mortality being 13 deaths, as against 63 in February. On the farm Avontuur 2 deaths occurred.

GLANDERS.

The following animals were tested with mallein on entry and found healthy: —3 horses, 1 mule and 30 donkeys.

TUBERCULOSIS.

The following animals were tested with tuberculin on importation from England, with negative results:—10 heifers and 1 bull.

HORSESICKNESS.

The heavy mortality from horsesickness continues, over 200 deaths (horses and mules) being reported.

EPHEMERAL FEVER (THREE-DAY SICKNESS).

This disease was prevalent during the early part of the month. The Veterinary Bacteriologist states that in certain herds it assumed very acute features, in some cases causing death with such rapidity that the animals were thought to have been struck by lightning, or to have died from anthrax. In some outbreaks, imported and grade stock suffered more severely than native stock under similar conditions. It is possible that some of the cases of abortion recently reported may be due to this disease, while pneumonia is quite a common sequel, especially in imported stock.

SPIROCHÆTOSIS.

This disease was detected in a calf suffering from a form of skin disease. The Veterinary Bacteriologist states that these parasites were previously detected in two calves in the Salisbury district, both of which have a peculiar dry condition of the skin with plaques and ulcers. He is inclined to believe that the condition is a specific disease caused by these parasites.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

Farming Calendar.

June.

BEE-KEEPING.

Where it is absolutely essential to examine bees during the cold months, and where located in bleak positions, open the hives when the sun is warm, but do not expose the bees more than is necessary. Be certain that there are ample coverings above the bees, at least three inches in thickness; the more wrappings of quilts and paper, the better the bees will winter. All parts of hives exposed to the weather should now receive attention. Roofs especially should be painted with at least two coats. Repairs to every hive in the apiary should now be carried out. Do not neglect to order appliances now in readiness for the coming season. Store carefully all section and shallow frame combs which have been drawn out during the past season; they will be needed to place above the brood nest just previous to the next honey flow in November.

CITRUS FRUITS.

Cultivation of the grove is to be continued and pruning taken in hand towards the end of the month. Washington Navel oranges and some earlier varieties will be ready this month for gathering, packing and despatch.

CROPS.

The harvesting of the smaller crops will now be over, except possibly peanuts, mangels and dhal. Pea-nuts should be lifted before the first frosts if possible. Mangels may safely be allowed to remain in the ground until required for use; or, if harvested, should not be heaped, but spread thinly on the ground at a convenient spot. Dhal will not be ripe until the end of the month, when the plants should be cut about a foot above the ground, allowed to dry for a few days, then shaken to free the seeds from the pods. Ploughing should be continued through the month if possible, and, if the maize is cut and stooked on the side of the lands, the maize fields should be ploughed to keep down such pests as the stalk borer. Winter crops of wheat, oats and barley will not require much attention. As a rule, where water is plentiful, too much irrigation is practised. One application per month will generally be found sufficient for the above crops.

DECIDUOUS FRUITS.

Pruning of deciduous trees should be done this month or in July.

ENTOMOLOGICAL.

Cabbage Family.—Plants of this family suffer from cabbage louse and Bagrada bug during June.

Onions.—Suffer from thrip. The transplants may be dipped as far as the roots in tobacco wash or paraffin emulsion to keep down the pest.

Fig.—The winter crop of fruit is liable to suffer from fig weevil. The infested fruit should be collected and destroyed. If this has been done regularly with the first crop, the second crop is not likely to suffer much.

FLOWER GARDEN.

Annuals for early spring flowering should be sown, preferably in boxes in a warm place sheltered from the wind. Perennials, shrubs and ornamental tree seeds may also be sown. Fruit trees, shrubs and roses should be pruned and all dead wood removed. Sweet peas require constant attention.

FORESTRY.

Burn out the grass in any fire traps round or near the plantation that were left unploughed. Any timber that is to be felled should be taken in hand this month.

GENERAL.

Grazing in drier districts is beginning to give out, and steps should now be taken to ensure that some good veld in the neighbourhood of the water is preserved for future use. It is a mistake, frequently seen, for all the grazing nearest to the drinking places to be first consumed, so that later on the cattle, when least able to endure fatigue and when the grass is in any case most scanty and dry, have furthest to walk from the feeding ground to water. A little forethought can obviate this trouble. Live stock are usually in good condition at this time of year and able to travel longer distances to water than may be the case later on in the season. Fire guards to prevent grass fires should be looked to.

POULTRY.

Early hatching should start this month. Stock birds should have been mated up at least ten days or a fortnight before the eggs are used for sitting. See that the male birds in the breeding pens are getting their full share of food. The brooders must be thoroughly cleaned and sprayed before the chicks are placed therein. Give your first feed to the chicks as early as possible each day and the last one immediately before they retire to rest. Their food, also that of poults, should be given little and often.

STOCK.

Cattle.—There is every indication of a good winter season for horned stock, and ranching cattle should not give much trouble. Dipping is best postponed during very cold snaps until a warm day occurs. Cows with autumn calves should be kept in the more sheltered paddocks. A watchful eye should be kept on all watering places in order to prevent their being fouled or stopped up. Bulls should be kept out of the herd until the end of July at least, and, in the meantime, they should be well fed and cared for in order to fit them for their work. The three watchwords in the dairy herd should be feed, shelter and bedding from now onwards. Ensilage will now be found invaluable. Good hay should be used to rack up with at night, and the maize ration should be supplemented with bean or buckwheat meal. A small ration of ground nuts will be found a useful feed. Calves are better in the pens except on warm days, when they may run on sweet veld for a few hours. The above remarks with regard to dipping and water supply apply equally to dairy as to ranching herds.

Sheep.—As most vleis are still very wet, sheep are best kept on the high veld for a while longer. If grass seeds are troublesome, a grazing area should be mown. If the rams were put into the flock in May, they should now be removed. Ewes with lambs will benefit by a few handfuls of mealies, and perhaps ensilage. They should be provided with shelter from cold winds.

TOBACCO.

If the stubble of the old crop has not been taken out and burnt, it should be done now.

VEGETABLE GARDEN.

All the available space in the garden should now be thoroughly trenched and manured, the soil being well worked and loosened. Vegetables planted out for winter crops should be well and continuously cultivated, which will help to bring them along quicker and with less watering. Late-bearing tomatoes should be sheltered from the cold winds by a grass shield. Beans should be staked and tied. Beet, radish, carrot, parsnip, turnip, onion, leek, mustard, cress, and tomatoes may be planted.

VETERINARY.

Horsesickness should be practically over now. Redwater and gall-sickness occur all the year round, but the worst time is the summer, when ticks are prevalent. Blue tongue should be very little in evidence now. After twelve months in this Territory, sheep do not contract the disease. Inoculation can be carried out now. Scab is a poverty winter disease.

WEATHER.

Casual rains may occur, but except on the eastern frontier, none is to be reckoned upon, nor can it be regarded as seasonable or desirable. Frosts generally occur on a few nights during the month of June, and precautions must therefore be taken. This month and the next are the coldest of the year, and when the cold is accompanied by dull weather or "Scotch mist," known locally as "guti," it is apt to have a severe effect on live stock, especially if grazing should at the same time be scarce and water supplies far to travel to.

July.

BEE-KEEPING.

See June.

CITRUS FRUITS.

Orange trees should be pruned this month, if this work is not completed. Groves must be well cultivated, especially after irrigation has taken place, and the soil round the trees hoed or dug over. Washington Navels will be gathered and some later varieties will be ready for picking. The irrigation of orange trees should be taken in hand when the trees are ready to commence the next growth.

CROPS.

See June.

DECIDUOUS TREES.

Pruning may be done this month.

ENTOMOLOGICAL.

Onions.—Thrip is liable to affect this crop, and when present calls for careful attention. Tobacco wash or paraffin emulsion should be used.

Deciduous Fruits.—Scale infested trees may receive a winter wash during this month. Lime sulphur salt wash or scalecide is recommended for this purpose.

Guava.—Citrus growers should always bear in mind that this fruit harbours citrus codling when there is no citrus fruit available. All guava trees, therefore, in the vicinity of citrus orchards should be stripped during this or next month, and the fruit buried deeply or burnt.

Fig.—Fig weevil may still be in evidence. The fruit is also sometimes attacked by citrus codling and other moths. The destruction of infested fruit is the most practical remedy for the pests.

FLOWER GARDEN.

Seeds of most annuals, perennials, shrubs and ornamental trees may be sown. Pruning, if not already done, should be attended to early. Dahlias and other summer-flowering bulbs should be taken up and stored for division and replanting whilst the soil is being prepared. Sweet peas require attention and staking.

FORESTRY.

Fell any timber that was left over from the previous months. Prepare soil for nursery beds.

GENERAL.

Veld fires are now liable to occur, and must be watched for and arrangements made to combat them. The loss that may result and the penalties under the Herbage Preservation Ordinance are to be borne in mind. Fire guards should this month be burnt round all grazing which it is desired to preserve for use later on.

POULTRY.

See that your brooder-reared chicks are warm enough during the cold nights, but do not overcrowd, and have the brooders well ventilated. Give your chicks as much run as possible when they are able to leave the brooder. There is little fear of rain now, and they will be healthier and develop better with a large shaded run. Do not let the mother hen and her brood sleep on the bare ground; they will probably be attacked by sand fleas.

STOCK.

Cattle.—On ranches the advice given for June applies still. The bulls may again be put into the herd at the end of the month. If grazing has been reserved for the winter months, it will probably be wise to turn the cattle into it now. Watch for any unthrifty cattle, and get them into the home paddock and feed them before they become really poor. Dairy cattle will require heavy feeding now, and if plenty of roughage is available, cows in milk will do better if kept in for a while on cold mornings and turned out only after the warmth of the sun is felt.

Sheep.—Vleis should now be fairly dry and may be utilised; otherwise, the advice given for June applies.

VEGETABLE GARDEN.

Sow turnips, beans, peas, onions, cabbages, beet, carrots, parsnips, radishes, lettuce and spinach.

VETERINARY.

Horsesickness and blue tongue should now have disappeared. Redwater and gallsickness occur all the year round, but the worst time is during the summer, when ticks are prevalent. Sheep may be inoculated against blue tongue now. Scab in sheep will probably be in evidence this month.

WEATHER.

Though rains have fallen during every month of the year in Rhodesia, none are looked for or desired this month. Most stations record an average of .01 to .3 inch over a number of years. Severe cold is likely to occur at this time of year, the lowest temperatures occurring an hour or two before sunrise. Frosts may be looked for, especially on calm clear nights. Cold windy days and damp "guti" weather tell severely on cattle, if shelter and food are not provided.

Market Reports.

The produce markets at Bulawayo and Salisbury are fairly well supplied with all lines.

At Mr. A. E. White's cattle sale held at Gwelo on the 14th April about 600 head of horned cattle were disposed of; also 40 donkeys, 100 sheep and some pigs. There were a good number of buyers from Bindura, Hartley, Gatooma and other places. Good slaughter cattle realised about 37s. 6d. per 100 lbs.; inferior slaughter cattle realised about 30s. per 100 lbs.; trek oxen were in demand from £6 to £10 each; tollies ranged from £3 to £5 each; good native cows from £5 10s. to £7 each; old native cows from £3 5s. to £4 10s. each; native heifers from £3 10s. to £5 10s. each; cross-bred native heifers from £7 to £9 each; cross-bred bulls from £8 10s. to £15 each; donkeys from £3 15s. to £4 10s. each. There was no demand for good cows or pedigree bulls. About 100 Friesland, Shorthorn and good Africander heifers were withdrawn; also some pure-bred Shorthorn, Friesland and North Devon bulls. One lot of 60 cross-bred Shorthorn-Mashona heifers were withdrawn, and afterwards were sold at £8 each. Sixty mare donkeys with and in foal to Catalonia Jack were withdrawn. Well-bred fowls fetched good prices.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs.	10/0	—	—	22/6 25/0
Beans, 203 lbs.	—	20/0 27/0	—	17/0 22/6
Boer Meal, unsifted, 200 lbs.	—	—	51/0 52/0	45/0 50/0
Bran, wheaten, 100 lbs.	7/6 7/9	—	12/6 13/0	15/0
Flour, 100 lbs.	—	—	—	25/0 26/0
,, Colonial, 100 lbs.	—	—	27/6 28/6	—
Forage, 100 lbs.	3/3 8/0	6/0	10/0 11/0	10/0
,, Colonial Oat	—	—	—	—
Hay	Bale. 6d. 1/2	—	Ton. 50/0 52/6	30/0 40/0
Kaffir Corn, 200 lbs.	8/0 8/11	—	16/6 17/6	10/0 11/0
Manna, 100 lbs.	2/6 4/0	—	—	5/0 6/0
Mealies, S.A. White, 203 lbs.	9/9 10/6	11/0 11/6	13/9 14/0	9/0 9/6
Mealies, Yellow, 203 lbs.	10/9 12/6	11/0 12/6	—	—
Mealie Meal, White, 183 lbs.	—	—	—	10/0
Munga, 200 lbs.	—	—	—	9/0 10/6
Monkey Nuts, bag, 83 lbs.	—	12/6	10/6 11/0	6/6 7/0
Oats, 150 lbs.	11/0	—	23/0 23/6	30/0
Onions, 120 lbs.	10/0 15/3	10/0 16/0	—	25/0 27/6
Peas, 200 lbs.	18/6	—	—	—
Potatoes, new, 150 lbs.	10/0 15/0	6/0 16/0	15/0 16/0	9/0 10/0
,, old, 150 lbs.	6/9 9/6	—	—	—
Rapoko	—	—	—	5/0 6/0
Rye, 200 lbs.	—	—	—	30/0
Salt, 200 lbs.	—	—	11/6 12/0	10/6 11/0
Wheat, 203 lbs.	—	—	—	30/0
Butter, local, per lb.	1/0 1/5	1/2 1/4	1/0 1/6	2/0 2/6
Eggs, local, per dozen	1/11 2/4	1/6 2/3	2/6 3/0	2/9 3/6
Ducks, each	—	2/0 3/0	—	3/6 5/0
Fowls, each	1/3 2/9	1/0 2/3	1/3 1/9	2/6 4/6
Geese, each	2/8 3/1	—	—	7/0 11/0
Turkeys, cocks, each	5/0 11/6	3/6 8/0	—	12/6 17/6

LIVE STOCK.

Slaughter Cattle, 100 lbs.	33/0	—	30/0 35/0	32/6 35/0
Trek Oxen, trained	£6/7/6 £7/7/6	—	£6 £10	£8 £10
Local Cows, milk	—	—	£7 £17/10	—
Dairy Cows	—	—	£20 £30	£22/10 £25
Native Cows	—	—	—	£5 £8
Heifers, Colonial	£4/5 £5/10	—	£7 £17	£7 £8
,, Native	—	—	—	£4 £6
Pigs, live weight	4½d.	—	3d. 4d.	4d. 4½d.
Horses, riding, salted	£35	—	—	£30 £35
,, ,, unsalted	£20 £35	—	£12 £30	£22/10 £30
Mules, inoculated	—	—	£25 £35	£25 £28
Donkeys, geldings	—	—	£4 £6/10	£4 £6
,, mares	—	—	£6/10 £8/10	£5 £7
Goats	11/6 12/9	—	8/6 15/0	10/0 15/0
Persian Ewes	—	—	—	20/0 22/6
Cross-bred Ewes	15/9 18/0	—	—	15/0 17/0
Sheep, slaughter	15/6 17/6	—	13/0 22/0	22/6 25/0

Weather Bureau.

TEMPERATURES.

Station	March		April	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
Mashonaland—				
Hartley—				
Farm Franceys	—	—	—	—
Gatooma	84·8	—	86·65	—
Giant Mine	—	—	—	—
Hallingbury Farm	80·4	59·1	80·8	55·2
Lomagundi—				
Clydesdale	—			—
Eldorado Mine	85·5	61·32	83·1	56·53
Kanyemba	65·7	-	96·1	
Sinoia	85·0	61·84	87·4	57·8
Sipolilo	84·4	60·0	85·16	59·4
Mangwendi—				
Good Hope	—		—	
Makoni—				
River Junction Farm ...		—	—	
York Farm	72·38	49·36	72·9	48·5
Mazoe—				
Melfort Farm Estate ...		—	—	
Shamva Mine	77·3	59·79	82·83	59·37
Melsetter—				
Melsetter	65·7	60·6	—	
Mount Selinda	—	—		—
Vermont	76·86	66·8	79·3	57·7
Salisbury—				
Chishawasha	79·08	59·2	79·4	55·48
Salisbury (Gaol)	79·6	57·7	80·7	55·0
,, Agric. Dept. ...	76·95	57·92	78·32	54·91
,, ,, Laboratory ...		—	-	
Umtali—				
Chiconga's Location ...	81·1	60·7	61·6	82·3
Summerfield	69·4	60·4	71·1	59·0
Umtali High School ...	80·95	60·0	83·76	57·63
Victoria—				
Eythorne	79·45	57·5	80·35	53·69
Victoria	77·7	57·2	81·56	53·73
Matabeleland—				
Bulalima—				
Plumtree	—	—		
Tegwani	79·0	—	85·4	58·6
Bulawayo—				
Essexvale	79·0	56·1	84·46	52·53
Observatory	75·7	56·5		—
Rhodes Matopo Park ...	79·5	55·8	82·7	52·6
Gwanda—				
Antelope Mine	80·99	60·4	85·43	59·21
Gwelo—				
Gwelo (Gaol)	77·7	—	80·01	68·0
Hagley (Iron Mine Hill) ...	76·09	54·4	80·99	52·7

TEMPERATURES—*(Continued)*.

Station	March		April	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—(Continued)				
Mangwe—				
Empandeni	83·3	—	84·8	62·83
Tuli—				
Mazunga	88·9	62·6	92·1	58·3
Tuli	92·0	64·3	87·4	62·3
Wankie—				
Guyo	82·2	56·8	—	—
The Hospital	91·2	66·2	89·05	69·8
Victoria Falls	85·6	52·5	73·73	66·16

RAINFALL.

Station	March	April
MASHONALAND :		
Charter—		
Buhera	5·34	1·23
Driefontein	4·92	1·29
Enkeldoorn	—	—
Grootfontein	4·11	1·94
Indiva Farm	3·48	0·20
Marshbrook	2·65	0·77
Riversdale	2·48	0·77
Spitzkop	4·69	1·66
The Range	3·76	—
Umvuma (Railway)	2·89	1·28
Hartley—		
Ardgowan	3·52	2·57
Auchter Leny	3·72	0·20
Battlefields (Railway)	2·36	1·97
Beatrice Mine	3·36	—
Carnock Farm	2·69	0·88
Clifton Farm	4·66	0·99
Daisy	—	—
Elephant Hill, Battlefields	—	4·30
Elvington	4·75	0·11
Franceys	3·07	2·03
Gadzema	2·56	0·18
Gatooma (Railway)	2·59	0·16
Gatooma	2·72	0·18
Giant Mine	2·88	—
Gowerlands	4·91	0·47
Hallingbury	3·44	0·61
Hartley (Railway)	4·02	0·90
Hartley (Gaol)	—	—
"Jenkinstown"	3·13	1·35
Makwiro	2·00	2·45
M'pofha Farm	—	—

RAINFALL—(*Continued*).

STATION	March	April
MASHONALAND—(Continued)		
Hartley—continued.		
Norton Siding	—	—
Shagari	1·70	0·42
"Stoneygate"	3·37	—
Lomagundi—		
Banket Junction (Railway)	2·54	1·81
Darwendale	5·22	1·05
Duxbury Farm	4·79	0·93
Eldorado	3·81	—
Eldorado Mine	3·96	0·78
Golden Kopje Mine	4·57	0·38
Kanyemba	4·50	
Lone Cow Estate	1·26	1·57
Longmead	2·86	1·39
Palm Tree Farm	3·41	3·04
Sinoia	3·52	0·83
Sipolilo	2·70	1·30
Umvukwe Ranche	2·03	1·82
Makoni—		
Chimbi Source	2·89	1·31
Eagle's Nest	2·97	1·27
Ellavale	2·81	1·31
Inyanga	2·59	0·36
Inyazura	2·37	1·08
Mona	3·66	1·26
Monte Cassino Mission	3·38	0·43
Odzi (Railway)	1·96	0·55
River Junction	—	—
Rusape (Railway)	4·84	0·73
Rusape	—	—
Springs	3·37	0·49
St. Trias' Hill	4·97	0·22
York Farm	3·41	0·53
Mangwendi—		
Bonongwe...	5·04	0·55
Glen Somerset	7·03	2·26
Huish Estate	5·31	0·57
Land Settlement Farm	—	—
Macheke (Railway)	1·89	1·70
Marandellas	—	—
Marandellas (Railway)	4·63	2·59
Mrewa	3·97	1·40
Mtoko	3·96	0·41
Mungo	—	—
Rusawi Outspan	—	—
Selous Nek	1·83	1·48
Theydon	3·67	1·54
Tweedjan	3·76	0·27

RAINFALL—(*Continued*).

Station	March	April
MASHONALAND—(Continued)		
Mazoe—		
Avonduur	2·14	1·15
Bindura (Railway)	6·59	1·29
Bindura	4·39	0·77
Ceres	4·07	0·84
Chipoli	3·49	1·23
Claverhill	3·13	1·21
Darwin	2·41	0·52
Dunmaglas	3·34	—
Fairview	3·54	0·51
Jumbo	2·66	0·60
Kilmer	2·53	1·23
Laguaha	2·68	0·60
Lowdale	2·64	—
Mazoe	3·25	—
Mguta Valley	—	—
Omeath	2·84	2·28
Pimento Park	—	—
Ruia	4·37	2·11
Shamva	—	1·07
,, Mine	2·22	1·05
Sleamish	—	—
Stanley Kop	3·40	0·11
Sunnyside	3·58	—
Teign	2·52	0·80
Umvukwe Flats	3·40	2·29
Waterfall Farm	—	—
Melsetter—		
Chikore	3·93	0·75
Chipinga	4·25	—
Helvetia	3·46	1·50
Melsetter	3·79	2·43
Mount Selinda	—	—
Mutambara Mission	1·81	—
Pasture	0·98	—
Tom's Hope	4·29	1·17
Vermont	3·16	3·61
Salisbury—		
Avondale	3·38	1·13
Botanical Experiment Station	—	1·07
Brookmead	4·16	1·18
Chishawasha	4·14	1·58
Cleveland Reservoir	2·99	0·86
Forest Nursery	—	—
Glenara	2·39	
Goromonzi	5·56	2·29
Gwibi	2·55	0·62
Hillside	3·20	0·97
Lilfordia	2·79	—
Salisbury (Agricultural Laboratory)	—	—
,, (Agricultural Department)	3·78	0·66

RAINFALL *(Continued).*

Station	March	April
MASHONALAND—(Continued)		
Salisbury—continued.		
Salisbury (Gaol)	3·63	1·08
,, (Club)	3·26	0·55
,, (Railway)	3·31	0·91
Sebastopol	2·79	1·15
Selby	2·24	—
Stapleford	3·05	—
The Meadows	3·13	1·88
Westridge	3·92	0·60
Umtali—		
Chiconga's Location	1·15	0·28
Odzani	1·46	0·76
Odzi	—	—
Penhalonga	3·03	1·63
Premier Estate	3·80	—
Public School	1·60	0·29
Stralsrund...	1·97	1·08
Summerfield	2·80	1·17
Umtali (Railway)	1·88	0·34
Utopia	2·45	0·61
Victoria—		
Chibi	2·90	Nil
Chilimanzi	4·00	0·42
Chingombe	2·63	0·49
Chiredzi Ranche, Ndanga	2·92	0·37
Clipsham	3·48	0·08
Elephant Hill	—	0·89
Empress Mine	4·06	0·70
Eythorne	4·22	0·01
Fairburn	4·48	0·74
Fort Victoria	—	0·06
Gokomere	4·48	0·20
Gutu	4·45	0·74
Hanyanya (Bikita)	5·19	1·37
Makorsi River Ranche	3·50	0·28
Marah Ranche	4·19	0·45
Marthadale	4·46	0·11
Morgenster	6·31	0·38
Ndanga	3·78	1·20
Noeldale	—	—
Pamushana	4·29	0·80
Silver Oaks	6·10	0·40
Tokwe River Ranche...	2·53	0·62
Victoria	3·63	0·03
MATABELELAND:		
Belingwe—		
Albany	3·38	Nil
Anglo-French Block	2·54	—
Filabusi	2·34	0·15
Fort Rixon	2·98	Nil

RAINFALL *(Continued).*

Station	March	April
MATABELELAND—(Continued).		
Belingwe—continued.		
Infiningwe	2·32	—
Insiza South	—	—
Insiza (Railway)	3·00	0·52
Mooifontein	—	—
Shangani (Railway)	2·72	Nil
Tamba	2·57	1·18
Thornville	3·06	0·07
Wedza	1·67	0·52
Bubi—		
Inyati	3·98	—
Leighton	4·49	—
Lochard Experiment Farm	3·35	Nil
Bulalima—		
Figtree	—	—
Mholi (late Magot)	1·00	2·14
Marula	—	—
Plumtree School	0·85	1·03
Riverbank Farm	1·10	0·76
Solusi	1·58	0·49
Syringa	2·85	1·51
Tegwani	0·83	0·77
Vlakfontein	—	—
Bulawayo—		
Balla Balla (Railway)	3·36	0·33
Bembesi (Railway)	2·68	0·48
Braemer	—	—
Bulawayo (Railway)	—	—
Crombie's	2·90	0·44
Edwaleni	4·70	—
Essexvale	2·00	0·11
Government House	2·65	0·20
Gwaai (Railway)	2·94	0·75
Heany Junction (Railway)	3·00	0·15
Hope Fountain	3·77	0·58
Imbesu Kraal	3·18	0·17
Impondeni	2·66	—
Keendale	2·33	0·46
Khami	2·82	0·71
Lower Rangemore	1·46	0·76
Matopo Mission	2·01	0·52
Maxim Hill	1·85	—
Melinakanda Junction	1·33	0·09
Nyamandhlovu (Railway)	1·98	0·43
Observatory	2·03	—
Pendennis	—	—
Raylton	2·28	0·45
Rhodes Matopo Park	3·25	0·92
Umgusa	—	—
Umkien	—	—

RAINFALL *(Continued)*

STATION	March	April
MATABELELAND—(Continued)		
Gwanda—		
Antelope Mine	1·11	0·25
Gwanda (Gaol)	0·88	—
,, (Railway)	0·99	0·79
Malundi	1·64	—
Mtshabzi Mission	2·53	0·77
West Nicholson (Railway)	3·24	0·14
Gwelo—		
Coppy Nook	4·57	0·65
Globe and Phœnix (Railway)	2·71	0·85
Gwelo (Gaol)	4·42	0·10
Gwelo (Railway)	4·53	0·43
Hagley	4·17	0·33
Indiva Farm	—	—
Lalapanzi	4·20	—
Lalapanzi (Railway)	4·51	0·41
Lower Gwelo	4·87	Nil
Que Que	2·62	0·64
Rhodesdale Estate	2·77	0·87
Selukwe (Railway)	7·25	0·63
Shawlands	—	—
Sikombela Farm	6·87	0·35
Umhlali Farm	—	—
Mafungabusi—		
Gokwe	3·63	1·0
Inyoka	4·65	1·10
Mangwe—		
Empandeni	0·64	1·49
Garth	1·22	0·96
Tuli—		
Lamulas	1·29	0·25
Langalanga	0·82	0·07
Makalali	0·77	0·37
Manantji	1·38	0·15
Mazunga	1·13	0·04
M'pande	0·85	0·13
Tuli	0·83	1·26
Wankie—		
Bombusi	3·49	—
Guyo	6·13	—
Malindi (Railway)	5·84	0·55
Victoria Falls	3·79	0·57
Victoria Falls (Railway)	3·83	0·45
Wankie (Railway)	4·92	Nil
Wankie Hospital	4·58	0·27

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1915		
			June	July	August
Bembesi	Queen's Mine Hotel	F. C. Anderson	4	2	6
Bindura	Bindura	A. C. Mills	12	..	14
Charter—Mgezi	Beatrice Mine	W. Krienke	30	28	25
Central	Umvuma	———	..	..	..
Eastern Border (South Melsetter)	Various farmhouses	J. W. Scott	1	6	3
Enterprise	Arcturus Hotel	J. Watson	2	7	4
Felixburg	Umvuma	E. C. Boardman	26	31	28
Figtree Branch, R.L. and F.A.	Figtree Hotel	A. Curtis	..	..	..
Gatooma	Gatooma	T. J. Golding	19	17	21
Gazaland	Chipinga	W. Wood	..	29	..
Greystone	Roodeheuvel, Shangani	J. W. Spencer	12	10	14
Hartley	Hartley	H. Savory	5	10	7
Headlands	Headlands	H. Barnes Pope	..	..	..
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. W. Twilley	26	31	28
Insiza—Shangani	Shangani	N. C. St. J. Brislin	5	..	..
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	12	10	14
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	..	..	..
Lomagundi	Sinoia	W. Abbott	19	17	21
Macheke	Macheke	H. H. Kidson	..	3	..
Makwiro	Makwiro	F. R. McLellan	18	16	20
Marandellas	Marandellas Farmers' Hall	E. P. de Kock	5	3	7
Mangwendi	Fixed every meeting	Luke Green	..	7	..
Makoni	Rusape	H. Barnes Pope	5	..	7
Marula	Marula Siding	Mac. W. Ingram	26	24	28
Mashonaland	Commercial Hotel, Salisbury	W. H. Williamson	12	10	14
Matopo Branch, R.L. and F.A.	Sibali	W. Bathurst	..	14	..
Mazoe	Glendale Siding	R. Newett	9	14	11
Melsetter (North)	Various farms	Rev. R. Wodehouse	5	..	..
Midlands	Gwelo	C. H. B. Mercer	12	10	14
Northern Umtali	Farm "Summerfield"	R. V. H. Blurton	..		7
Norton and District	Norton Store and Hotel	T. A. Osler	5	3	7
Que Que	Globe and Phœnix Hotel	E. E. Somerset	19	17	21
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	25	30	27
Shamva	Shamva	J. M. Moubray	No dates fixed		
Southern Insiza	Peggy Hotel, Insiza	W. J. B. Harris	6	4	1
Selukwe	Selukwe	F. S. Clark	No dates fixed		
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	10	..
Umvukwe	Umvukwe	H. K. Bracewell	26	24	28
Umtali	Christmas Pass Hotel	J. S. Holland	5	3	7
Victoria	Victoria	H. S. Hoatson	16	21	18
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	12	10	14

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a ¼ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, in

which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin: also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of

good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping

plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.

3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia:—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
No. 62. Services of Agricultural Engineer.
No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.
No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
No. 94. Second Report on Experiments, by J. H. Hampton.
No. 125. Subterranean Water, by W. M. Watt.
No. 153. Citrus Fruit Trees—From Seed to Grove.
No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.
No. 156. Elephant Grass or Napier's Fodder, by J. A. T. Walters, B.A.
No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.
No. 166. Rhodesian Citrus Fruits—Exportation to London.
No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.
No. 185. Citrus Fruits—The Preparation of Oranges for Market, by C. E. Farmer.
No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.
No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.
No. —. Orange and Lemon Growing in Southern Rhodesia, by R. McIlwaine.
No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.
No. 205. Hints on Irrigation: Small Earthen Storage Reservoirs, by W. M. Watt.
No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.
No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.
Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
No. 106. Cultivation and Preparation of Ginger.
No. 126. Turkish Tobacco.

No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.
No. 138. Tobacco Culture (Virginia)—Harvesting and Curing.
No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.
No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.
No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.
No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.
No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.
No. 179. Buckwheat, by H. G. Mundy, F.L.S.
No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.
No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.
No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.
No. 194. Rye, by J. A. T. Walters, B.A.
No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.
No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.
No. 58. Onion Thrips, by R. W. Jack, F.E.S.
No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.
No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.
No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.
No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.
No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.
No. 147. Root Gallworn, by R. W. Jack, F.E.S.
No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.
No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.
No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.
No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.
No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.
No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.
No. 178. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.
No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.
No. 197. Chafer Beetles, by R. W. Jack, F.E.S.
No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.
No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.

No. 74. The Detection and Prevention of Diseases of Stock in Rhodesia, by Ll. E. W. Bevan, M.R.C.V.S.

No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.

No. 95. Oestrus-ovis in Sheep, by Alec King.

No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.

No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.

No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.

No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.

No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.

No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.

No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

Conditions under which Government Veterinary Surgeons' Services are available to the public.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.

No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.

No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.

No. 163. Feeding and Care of Imported Cattle, by R. C. Simmons.

No. 167. The Construction of Dipping Tanks for Cattle.

No. 169. The Breeding and Feeding of Pigs for Bacon Factory Purposes, by R. C. Simmons.

No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.

No. 208. Water in the Diet of Live Stock, by Ll. E. W. Bevan, M.R.C.V.S.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.

No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.

No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.

No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.

No. 150. Dry Season and Droughts in Rhodesia, by the Rev. E. Goetz, S.J.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 150. Hints on Brickmaking, by G. T. Pyke.

No. 158. Gwelo Creamery: Hints and Suggestions to Farmers, by W. G. [illegible].

No. [illegible]. Report on the Methods of Handling, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorer.

No. 163. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 164. Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. [illegible]. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. [illegible]. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. [illegible]. Poultry Keeping for the Rhodesian Farmer, by Frank Stephens.

No. [illegible]. Eucalypts for the Farm, by J. J. [illegible].

No. [illegible]. Home Butter Making, by R. C. Simmons.

Malarial Fever: How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

The Prevention and Treatment of Blackwater Fever, by Dr. A. M. Fleming.

Malaria: its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law: Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc.

HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

H. C. M.—Wanted on general farm, Gwelo district, farm assistant. Salary £5 per month, board and lodging.

D. & R.—Farm assistant; £5 per month and food.

W. T. S.—Energetic young man as assistant on mixed farm in Midlands district.

SITUATIONS WANTED.

C. B.—As general assistant; good knowledge of [illegible] and bricklaying; experience in all crops, including cattle, also handling of cattle.

V. T.—As tobacco man; experience in Java, United States and Nyasaland.

P. G. G.—As manager of farm. Experience in all branches of farm work.

W. E. R.—Employment wanted in pruning trees. Thoroughly experienced; worked in California and with Mr. Pickstone, Cape Colony.

J. T. G.—Youth residing in England desires employment on a dairy farm; twelve months' experience on a dairy farm in England; age 16½ years.

W. E. P. N.—As assistant on farm. Good practical experience. At present residing at Christiana. Would like fare paid, which can be deducted from salary.

C. S.—As assistant on farm. Six years' experience with cattle and general farming in Cape Colony.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except:—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:*—

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:*—

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed

by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

Veterinary Districts of Southern Rhodesia.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways: 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding: 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 24 of 1914.] [14th January, 1914.

(As amended by Nos. 207 and 395 of 1914 and 167 of 1915.)

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 82, 129, 143, 258, 297 and 326 of 1913, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas :—

NATIVE DISTRICT OF UMTALI.

(a) *Areas of Infection.*

The farms N'odzi and Nyagari, and the Penhalonga Valley.

(b) *Guard Area.*

The farms Mabonda, Mountain Home, Umtali Mission, Imbeza Valley, Duris and Forest Farm.

No. 130 of 1915.] [22nd April, 1915.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease, to wit, African Coast Fever, on the farm Helenvale, in the native district of Salisbury, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the undermentioned to be actively infected with African Coast Fever for the purposes of the said Ordinance: The farms Greystone, Helenvale, Carrickcreagh, Luna and the Chindamora Reserve.

No. 167 of 1915.] [21st May, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance 1904," I do hereby cancel Government Notices Nos. 207, 239, 449 and 507 of 1914 and 87 of 1915, and in terms of section 12 of Government Notice No. 50 of 1912 declare the following areas of infection and guard areas :—

1. SALISBURY AND MAZOE NATIVE DISTRICTS.

(a) *Areas of Infection.*

(1) Hatfield Estates and Hatfield Plots.
(2) Salisbury Commonage.
(3) M.T.C., Gallagher's Lease, and Makabusi Farms.
(4) Epworth, Adelaide and Glenwood Farms.
(5) Bluff Hill Farm.
(6) Tynwald Farm.
(7) Sigaro Farm.
(8) Mabelreign Farm.
(9) Borrowdale, Helenvale and Glen Lorne Farms.

(b) *Guard Area.*

An area bounded by and including the following farms :—Bitton, Syston, The Lily, Ballineety, Penrose, Derry, Glen Lussa, Rainham, Gillingham, Parkridge, Crowborough, Lochinvar, eastern sub-division of Willowvale, Glen Norah, Hopley, Saturday Retreat, Reserve, Odar, Stoneridge, Eyrecourt, Boutelle, Twentydales, Nalira Reserve, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, Chindamora Reserve, Pote, Valeria, Spelonken, Christon Bank, Mgutu, Pearson Settlement, Passaford, Spa and Weltevreden.

2. MELSETTER NATIVE DISTRICT.

(a) *Areas of Infection.*

The farms Springfield, Tarka, Clear Water, Nooitgedacht, Randfontein, Avontuur, Enhoek, Ravenswood, Landsdown, Chipinga West and Wolvedraai.

(b) *Guard Area.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nayanyadzi River.

No. 168 of 1915.] [21st May, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard area in the native district of Mazoe :—

(a) *Areas of Infection.*

Belford Estate, Belford Estate No. 2, Belford Estate No. 3 and Belford Estate North, including sub-divisions.

(b) *Guard Area.*

An area bounded by and including the following farms :—Naauw Plaats, Mooi Leegte, Oude Kraal, Klein Kopjes, Leeuw's Rust, Burley Bottom, Howick Estate, Manyewe, Southmoor, Somerset, Rockwood, Summerdale, Normandale, Yarrowdale, Vacant Land and Great B.

No. 175 of 1915.] [28th May, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Sternblick, in the native district of Salisbury, to be an area of infection.

No. 86 of 1915.] [25th March, 1915.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease, to wit, African Coast Fever, on the farm Sigaro, in the native district of Salisbury, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the undermentioned area to be an area actively infected with African Coast Fever for the purposes of the said Ordinance :—

An area bounded by and including the following farms : Sigaro, Patterson, Mgutu, Pearson Settlement, Passaford, Spa, Weltevreden, Bitton, Syston, The Lily, Ballineety, Penrose, Derry and Forest Reserve.

No. 506 of 1914.] [10th December, 1914.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of a destructive disease, to wit, African Coast Fever, on the farm Nooitgedacht, in the native district of Melsetter, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the above-mentioned farm to be an area actively infected with African Coast Fever for the purposes of the said Ordinance.

No. 147 of 1915.] [6th May, 1915.

ENZOOTIC ABORTION.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare the farm Great B, in the native district of Mazoe, to be actively infected with the disease known as enzootic abortion for the purposes of the said Ordinance.

No. 174 of 1915.] [28th May, 1915.

ENZOOTIC ABORTION.

WHEREAS there has been an outbreak of destructive disease, to wit, enzootic abortion, on the farm Great B, in the native district of Mazoe, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the abovementioned farm to be an area actively infected with enzootic abortion for the purposes of the said Ordinance.

No. 381 of 1914.] [3rd September, 1914.

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of this Notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe and Gwanda.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 527 of 1914.] [31st December, 1914.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the 1st day of January, 1915, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including the Salisbury native district bounded by and including the following farms:—Lilfordia, Saffron Walden, Kilworth, Porta, Outspan, Clements' Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Odar Outspan, Stoneridge, Longlands, Seki

Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Caledonia, Hartmans, Chishawasha, Glenlorne, Borrowdale, sections 4 and 1, The Willesden, Lowdale, Ingleborough, Mguta, Great B, Umsasa, Springvale, Passaford, Spa, Fairview, Nalire, Penrose.

No. 70 of 1915.] [4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms :—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar, Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 505 of 1914.] [10th December, 1914.

CLOSING OF GATES ON ROADS, ETC.

UNDER and by virtue of the powers vested in me by section 26 of the "Fencing Ordinance, 1904," I do hereby provide that travellers passing through a gate erected on a public or private road in terms of section 25 of the said Ordinance, and omitting to close such gate after having passed through, shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address..
2. Number and Class of Cattle to be imported...
3. Area or Farm and District where Cattle are at present located...............
....
4. Area or Farm and District to which Cattle are to be moved.................
....

Applicant's Signature..

Date...................................
Application..........................
Permit No..........................

ANNEXURE "B."

I, ... residing on the farm .... in the district of .... do solemnly and sincerely declare that the .... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals .... Bulls .... Heifers ....
Breed ....
Seller's Name and Address ....
....
Purchaser's Name ....
Place in Southern Rhodesia to which animals are being sent
....

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at .... on this .... day of..................
before me,

....

Resident Magistrate for the District of ....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London

Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, ETC.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries :—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in

default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals, nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date.., 19...

Place ....

....

Signature of
Government Veterinary Surgeon.

Number and general description of animals:

..............Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent:

....

Owner's name and address:

....

....

Place in Southern Rhodesia to which it is desired to send the animals ....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at ....
in the district of... .... in the............................
Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to.................................† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at..on this..............
day of...before me.

....
Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent..............................
Owner's name and address...
....
Place in Southern Rhodesia to which animals are being sent........................

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.
Gwanda.
Plumtree.
Fort Rixon.
Belingwe.
Inyati.
Fort Usher.
Mphoeng's.
Holi.
Filabusi.
Gwaai.
Figtree.
Umvuma.
Que Que.

No. 375 of 1912.] [28th November, 1912.

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any dis-

ease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches; and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :
Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :
Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Open areas.

The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following areas in the Hartley district and the Sebungwe district until further notice.

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

Sebungwe District.—From the confluence of the Sengwe and Lutope Rivers up the Lutope to its headwaters, thence in a south-east and easterly direction following the southern edge of the escarpment, leaving Meare's farm to the south, to the Mafungabusi Peak, thence northwards along the escarpment to the Njelele River, and down that river to its confluence with the Sanyati River, thence northwards down the Sanyati River to its confluence with the Piriwiri River, thence direct in a north-westerly direction to Picaninyemba, and thence along the footpath to Nenyunka on the Sengwe River, thence southerly up the Sengwe River to its confluence with the Lutope.

Elephants, Hartley District.—Notice No. 168 of 1914 permits the shooting or capturing of elephants on or within five miles of the farm Walden, in the Hartley District, for a period of one year from 9th April, 1914.

The game specified may be shot in these open areas without a licence.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

No. 390 of 1912.] [19th December, 1912.

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds :—

(1) Great Locust Bird or White Stork (*Ciconia alba*);
(2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*);
(3) Small White Heron or Cattle Egret (*Bubulcus ibis*);
(4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 171 of 1915.] [21st May, 1915.

PROTECTION OF GAME ON COMMONAGES.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906." I do hereby declare that up to the 30th day of April, 1916, all game within the limits of the commonage or townlands of Umtali shall be strictly protected, and shall not be hunted or destroyed.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits
Bread
Butter
Confectionery
Cigarettes
Dried & Bottled Fruits
Dried Meats
Eggs
Flour
Flowers
Honey
Jam
Plants
Poultry
Seeds
Sugar
Tobacco
Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. EYRE,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

(Photo by Messrs. Smart & Copley, Bulawayo.)

Judging for the 1,000 guinea trophy, Bulawayo Show, 1915.

THE RHODESIA
Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

PUBLISHED BI-MONTHLY.

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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

THE AGRICULTURAL SHOWS.—Agricultural shows have been held at Bulawayo, Umtali, Glendale, Victoria and Salisbury, and we take this opportunity of congratulating the various committees upon the success achieved in what were, in some cases, very difficult circumstances. We particularly congratulate the Mazoe farmers upon the result of their inaugural effort, and cordially wish them every success in the future. We do not intend to give here a descriptive account of the various shows, as this appears elsewhere in this *Journal*; suffice it to say that in this young country, where we have so many problems connected with the culture of the soil and kindred matters, the educational value of these shows cannot be over-estimated, and we hope to see them regularly held wherever it is possible to do so. With the exception of the Victoria Show, which fell on the same day as the Mazoe Show, H.H. the Administrator was present at each—performing the opening ceremony—and there is no doubt that his presence was much appreciated and regarded as an indication of the very deep interest the Administrator takes in agricultural matters.

STRENGTH OF THE DIPPING TANK.—The recent outbreaks of African Coast Fever in Mashonaland have shewn that in some cases the fluid in the dipping tank was not up to the required strength, and, judging from the nature of the enquiries received at the Agricultural Laboratory, it is evident there is a good deal of ignorance as to how the strength of the dip should be maintained. It is of the greatest importance that the dipping fluid should be of the correct strength, inasmuch as the effectiveness of short-interval dipping entirely depends upon the composition of the dip, which has to be sufficiently strong to kill the tick, but not so strong as to harm the cattle passed through it at the short intervals necessary for the destruction of the different species of ticks. Instructions regarding dipping have from time to time appeared in this *Journal*, but it would appear necessary to now reiterate and to perhaps elaborate some of the advice given.

In the first place, we would state that the only accurate way of ascertaining the capacity of the dipping tank is by introducing the dip or water from a smaller tank of known dimensions. A tank of, say, 50 or 100 gallons, or even greater capacity, should be erected in such a position that its contents can be emptied into the dipping tank. The level attained by each emptying can then be indelibly marked on the side of the dipping tank, or on a gauge post placed in the tank. This we consider is the only reliable method of ascertaining the capacity of the dipping tank at various depths. The revised schedule which was given on page 308 of the June issue of the *Journal*, it should be remembered, only gives the *approximate* capacities of a tank built *strictly* according to the dimensions shewn on the plan enclosed with Bulletin No. 167 and the December, 1913, number of the *Journal*. It is, however, only very rarely that dipping tanks are built exactly to these dimensions, and the capacities given can only serve as a guide and are not to be relied upon when mixing the dip.

It is advisable to always maintain the fluid in the dipping tank at a certain level. It is estimated that each beast passing through the tank takes with it approximately half a gallon of fluid, and this has to be replaced. After the cattle have been dipped and all the fluid has drained back into the tank, the depth of the tank should be carefully measured and the loss at once replaced with the requisite amount of water and dip. For this purpose the reservoir tank referred to will be used, the dip being mixed therein and the required quantity of solution run into the dipping tank. Just previous to dipping again, the depth of fluid in the dipping tank should be carefully measured. If the level has dropped, this will be due to evaporation, in which case *water only* must be added to bring the fluid up to the previous level. If, however, flood water has entered the tank, extra dip must be added, as the strength of the dip is consequently reduced. If the dipping tank has been measured off as previously stated, the amount of water that has entered the tank will be readily ascertainable, and the quantity of dip to add can be easily proportioned. In addition to evaporation and flooding, the dipping solution is liable to undergo chemical changes, and should from time to time be submitted to the laboratory test, which will indicate whether the arsenic content is above or below standard strength.

We will now assume that the laboratory analysis shews that the fluid in the dipping tank is below strength. Cooper's Improved Cattle Dip is mixed in the proportion of 1 gallon to 200 gallons of water for seven-day use. The laboratory analysis may possibly shew that the fluid in the tank is only equivalent to 1 gallon of dip in 250 gallons of water. There are, we will assume, 3,000 gallons in the dipping tank. We now have to bring the fluid up to strength. The amount of dip to be added can be ascertained by a very simple calculation. Cooper's Improved Cattle Dip is, as stated, used in the proportion of 1 gallon to 200 gallons of water, and therefore in the 3,000 gallons of fluid in the tank there should be 15 gallons of dip. The analysis shews that there is 1 gallon of dip in every

250 gallons of water. There are, therefore, only 12 gallons of dip in the tank. Thus :—

No. of gallons in tank ...	3,000
No. of gallons of dip that should be in tank	$\frac{3,000}{200} = 15$ gallons.
No. of gallons of dip actually in tank	$\frac{3,000}{250} = 12$ gallons.
No. of gallons of dip short ...	$15 - 12 = 3$ gallons.

In this case, 3 gallons of dip must be added to the fluid in the dipping tank.

If these simple directions are followed and cattle are systematically dipped, we are convinced we shall see a substantial diminution in the incidence of disease in this country. There has, without doubt, been considerable laxity in the method of dipping in the past, but there are signs now that farmers are beginning to realise the vital importance of the matter. We hope to see dipping practised very much more extensively throughout the country, and we think that farmers for their own safety might co-operate with the Government in seeing that dipping, where compulsory, is properly carried out.

A question has been asked as to whether oxidation in arsenical dipping fluids can be prevented by the application of disinfectants. We might mention that experiments with this object in view were conducted at the Agricultural Laboratory, Salisbury, some two years ago, but although numerous formulæ, including carbolic acid, were tried, none gave a satisfactory result. As regards the "apparent" loss of arsenic in the dipping fluid due to oxidation, it might be necessary to repeat here the conclusion come to as the result of experiments conducted in the same year by the Assistant Agricultural Chemist, viz., that there is no necessity to renew a dip in which a fair number of cattle are dipped at short intervals, until it has become too dirty for use.

A Meat Canning Factory for Rhodesia.—In another portion of this *Journal* appears an article from Mr. O. C. Rawson, describing the aims and objects and giving particulars of a meat canning factory which it is proposed to erect in Salisbury. We do not intend entering into the details of the scheme, as these are ably and clearly set out by Mr. Rawson, but we would advise our readers to carefully peruse the article and make themselves acquainted with what is happening. For ourselves, we think the scheme is an excellent one, and sincerely hope it will have the support of all stock-owners. There is without doubt ample scope for a canning factory in this country, for unquestionably the time is rapidly arriving, if it has not already arrived, when we shall have a surplus of slaughter cattle over local requirements. These animals are not of the type suitable for export, and, even if they were, there are by no means sufficient to warrant the erection of freezing or chilling works. As has been found to be the case in the large beef exporting countries, the difficult period is that between the time there is a surplus of stock and the time this surplus is of sufficient dimensions to establish an export carcase trade. We confidently expect to have a sufficient number of animals of the required type in this country in due course for exporting purposes, but in the meantime some means have to be devised for finding a market for the disposal of the surplus we now have. The canning factory will go a long way towards solving the difficulty, and we trust the scheme will be successfully launched.

Export of Maize from Rhodesia.—The work of grading this season's maize crop has commenced, and there are indications that the yield will be in excess of the forecast given in the June issue of this *Journal*. Negotiations are still proceeding regarding the question of obtaining ships to carry the grain, and also in regard to freight charges, and we can only trust that a satisfactory arrangement will shortly be arrived at. For the first time Rhodesian maize is being graded by the Government graders before it is loaded at the various sidings. The farmer, therefore, has the satisfaction of knowing that all the accepted grain has passed the grader's test, and he is thus saved the expense of railing stuff that might be rejected later. Warnings have been issued to growers who are members of the Farmers' Co-operative Society on the need of discarding discoloured cobs and the need of exercising great care in the shelling, winnowing and bagging of their grain. These warnings have resulted in greatly improved quality this season, and the percentage of first grade grain is distinctly higher than it was last season. Reports received from graders up to now indicate that the amount of wet grain, *i.e.*, grain containing over 12 per cent. water, is distinctly low. Such grain is, of course, immediately rejected, however good the quality may otherwise be. Much of the grain, however, obtains a second grade certificate on account of the high quantity of discoloured grain present. Rhodesian maize has a high reputation on the Home markets, and it behoves all growers to do their best to maintain it.

In the June number of this *Journal* we reproduced a circular letter issued by the Farmers' Co-operative Society giving detailed instructions regarding the method of handling grain for export. We have had reprints made of this circular, and if any of our readers would like to receive a copy, we shall be pleased to send one upon application.

THE OIL FACTORY.—Some 5,000 odd bags of ground nuts have, up to the present, been received at the Oil Factory, and visitors to the various agricultural shows will have seen samples of the salad oil and cake manufactured therefrom. Both the oil and the cake have had a very favourable reception, and an increasing enquiry for each is being received. This is very satisfactory, and, provided the quality is maintained, there is no reason why all our requirements of these commodities should not be met locally, for the price of each is considerably cheaper than the imported article. Further, it behoves us all to support a local industry of this kind, which, if successfully established, must prove of considerable benefit, not only to farmers, but to the community at large. Elsewhere in this *Journal* will be found an analysis by the Assistant Government Agricultural Chemist of the ground nut cake. From the figures there given it will be seen that the local cake is considerably richer in protein than linseed cake, and although its actual value cannot be determined until systematic feeding experiments are carried out, from enquiries we have made, very satisfactory results have attended the use of the ground nut cake obtained from the Oil Factory.

In this connection we might mention that Mr. C. Willmot of Marandellas has been feeding about 2 lbs. of cake per day to each of his milk cows, together with 4 or 5 lbs. of crushed mealies. Owing to delay in forwarding a further consignment, he was without the cake for a matter of two or three days, with the result that his cream supply dropped 50 per cent. Within a day or two of the arrival of the cake the supply was again normal.

It is suggested by Mr. R. C. Simmons, Chief of the Animal Industries Branch, that a ration somewhat as follows will be found very satisfactory for cows in milk, which at the same time are getting fairly good grazing :—

Crushed mealies soaked	5 lbs.
Ground nut cake	2 lbs.
Maize hay, or some other kind of good dry roughage	10 lbs.

If the grazing is inferior or very dry, pumpkins or ensilage might be given, the quantity being so regulated as to avoid scouring.

For dairymen the addition of oil cake to the ordinary ration during the dry season is essential, but there is every reason to suppose that the ground nut cake, as procurable at the Oil Factory, can be profitably fed to animals fattened for the butcher.

In another portion of this *Journal* we publish a circular letter issued by the Oil Factory relative to the railway charges on oil seeds consigned to the factory and furnishing information regarding the return of empty sacks and the purchase of this season's crop of all varieties of sunflower seeds. The new railway rates constitute an appreciable reduction, but it will be noted that they only apply when seeds go forward in full truck loads.

MATABELELAND FARMERS' CO-OPERATIVE SOCIETY.—The co-operative movement is steadily gaining ground in Rhodesia, and we now have pleasure in recording the formation of a society in Matabeleland for the disposal of farmers' produce and slaughter stock. The scheme has materialised under the auspices of the Rhodesian Landowners' and Farmers' Association, and the following well-known farming men comprise the board for the first twelve months :—Messrs. Hull, Fletcher, Morgan, Moffat, O'Keefe and Bland.

The society is established under the provisions of the Co-operative Agricultural Societies Ordinance of 1909, and the rules and regulations in the main are those of the Salisbury Farmers' Co-operative Society, modified, however, to meet the special conditions prevailing in Matabeleland. Therefore, members bind themselves to dispose through the society of their maize, kaffir corn, nyouti, beans, potatoes, monkey nuts, oats and forage, with slaughter stock and slaughter pigs. At Salisbury, of course, maize is the only crop that members undertake to sell through the society.

A working agreement has been entered into with Mr. F. E. Woods, of Bulawayo, whereby he undertakes, under the direction of the board, the full management of the affairs of the society, as well as the storing and handling of members' produce, on a 5 per cent. commission, and in the case of slaughter stock on a 2½ per cent. basis. This relieves the society, for the first twelve months at least, of practically all the financial responsibility and trouble involved in engaging a capable staff and erecting or leasing suitable buildings and business premises. At the expiration of twelve or eighteen months the society will take over the business premises now occupied by Messrs. F. E. Woods & Co. at a price to be arranged, and Mr. Woods has agreed, if elected, to accept office on the board of management of the society.

As regards the contributions of members towards capital, in the case of the maize-grower, 1s. per bag is to be deducted from the first year's crop. The member is then free from any further deduction for capital, unless, in any subsequent year, he has a surplus crop, in which case he pays 1s. per bag on such surplus. This is the principle under which the Salisbury society works, and the provisional board in its report stated that there was every reason for believing that an arrangement could be made with the Salisbury society which would prevent the maize market in Matabeleland from being glutted.

In the case of stock-owners, 5 per cent. will be deducted from the net proceeds of the sales, but the proportion of this 5 per cent. which will be allocated to capital is to be left to the decision from time to time of the board. It is anticipated, however, that it will not cost cattle-owners more than 2½ per cent. to sell their stock through the society, and the remaining 2½ per cent. will be credited to the member in each case as contribution towards capital.

In the case of members other than maize-growers and cattle-owners, it is not expected that any contribution shall be made towards capital during the first year, as the actual cost of handling and disposing of the produce will absorb the whole of the 5 per cent. deducted from the proceeds of sales, and it is not deemed desirable to discourage and hamper small producers and farmers by imposing a higher charge. It is anticipated, however, that after a year's working it will be possible to allocate the working costs of the society in such a manner that each member will bear his fair share of such cost, proportionate to the general cost of dealing with the particular class of produce in which he is interested.

For the present, maize is the only crop that is to be pooled.

We are pleased to see that this new society is making a modest start, and is not operating on too ambitious a scale. Practically all successful co-operative movements have had small beginnings, and we trust that the end of the first year will see the society established on a firm basis, thus paving the way for the extension of co-operation in the various other directions in which it can be successfully employed.

"ENKELDOORN PRODUCE EXPRESS."—We are pleased to record the inauguration at Enkeldoorn of a rapid ox transport service for the purpose of marketing small products and perishables. The system of working is similar to that which has been successfully adopted in the Marandellas district, and as from the beginning of this month a wagon will travel—at first once a week, and later twice a week—along a route of over 70 miles from the neighbourhood of the N'gesi River, *via* Enkeldoorn, to Umvuma, collecting produce from members of the syndicate.

We see in the initiation of this scheme a practical application of the co-operative principle which is rapidly assuming concrete form in the farming practice of this country, and trust that the new service will work economically and achieve the object for which it was inaugurated.

SOUTH AFRICAN BUTTER ON THE LONDON MARKET.—As most of our readers are doubtless aware, the Union has of late adopted an enterprising and progressive export policy with a view to obtaining a market for certain articles which she is eminently capable of producing. The London market has recently been tested with experimental shipments of beef and eggs, and we in Rhodesia note with very much interest the developments which are taking place. We now see that 20 cases of butter from the Nel's Rust Dairy, Natal, were recently sent to London, and it is interesting to note what Messrs. Weddel & Co. have to say about the consignment. They report :—

"We were agreeably surprised at the high standard of quality shewn by every box in the consignment. We doubt if a first shipment from any country ever met with a more favourable reception by the Trade. All those to whom the butter was shewn—and they were the best judges and most select buyers—spoke most highly of its quality. We heartily congratulate you on your enterprise and South Africa on its capability of supplying the Mother Country with a butter that promises to be unsurpassed by that from any other Dominion.

"The prices realised were 132s. per cwt., which was the top price of the best Australian butter on the day of sale."

In a subsequent report, Messrs. Weddel & Co. say :—

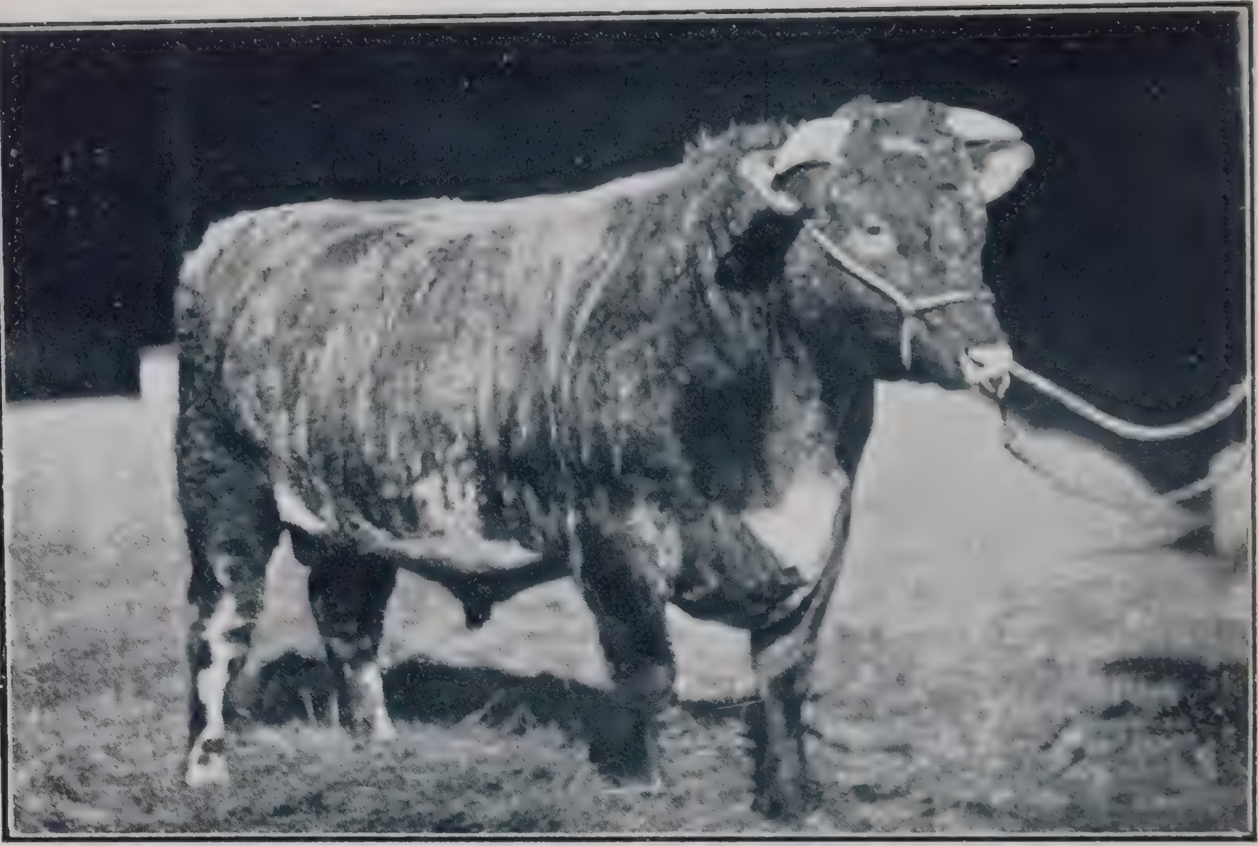
"We are pleased to be able to say that our examination of two of the boxes (kept back to test thoroughly the keeping qualities) fully confirmed the opinion expressed in our previous letter as to the general high quality of your consignment."

This is distinctly encouraging, and augurs well for the future of the dairy industry in South Africa. We presume, however, it is not intended just yet to establish an export trade in butter, for at the present time local requirements are by no means met in the country. Thus we see that in 1914 butter to the value of £194,768 was imported into South Africa, and there would appear to be plenty of scope for the present in extinguishing this item. As regards eggs and meat, South Africa is still a large importer of these commodities, for in 1914 £59,314 was paid for eggs brought from overseas, while for meats in different forms the bill amounted to £382,336. The position in Rhodesia is practically the same as it is in the Union in this respect, but with them we look forward to the day when, having overtaken the local demand, we shall be able to enter the world's markets. As regards the dairy industry, it may be interesting to quote what Miss Maidment, the well-known dairy expert, who visited this country a few years ago, had to say. Miss Maidment stated :—" Before concluding this somewhat brief report, I should like to say that I proved beyond a doubt from practical experience that Rhodesia can produce the finest cheese and butter in the world. In spite of great disadvantages always encountered when an audience had to be considered, I made some of the finest butter and cheese that I have ever seen. The butter was marvellous, as I often had to make it in the afternoon in a temperature of 85 degs. F., with no means of cooling, either natural or otherwise, and in spite of all disadvantages, it resembled the produce of our best Channel Island cattle, which is always of a firmer texture and higher quality than the produce of other breeds." This calls for no comment from us, except perhaps to recall the fact that Rhodesian butter secured two first prizes at the recent Johannesburg Show. There is without doubt a great future before South Africa in the dairy industry, and we are very pleased to see the very favourable impression the pioneer consignment has created.

ORANGES FOR THE TROOPS.—Our readers will have seen in the daily Press a suggestion to send oranges from Rhodesia to the troops fighting in Europe, and the notification of the appointment of a committee to give effect to the proposal. An endeavour is being made to send away 200 boxes of oranges and lemons, and at the time of writing the scheme is progressing satisfactorily. All will agree, we think, that the proposition is an excellent one, and there is no doubt that at this time of the year the fruit will be highly appreciated, especially in military hospitals, where our brave men are cheerfully enduring great suffering in their country's cause. We can look with pride upon the part Rhodesia has played in this frightful upheaval, and this latest endeavour to be of some use to the Motherland will, we are sure, meet with universal approval.

DATES OF FARMERS' MEETINGS.—Appearing in the *Journal* regularly is a list of the dates upon which the various farmers' association meetings are held. We try to make the information given as accurate as possible, and with this object write to the secretaries from time to time requesting to be notified of any changes that may be made. We do not, however, always succeed in obtaining the desired information, and it occasionally happens that the particulars as published are not correct. We shall be pleased if the various secretaries will scan the list appearing in this issue, and in any case where incorrect information is given, notify the Editor as early as possible.

ANIMAL DISEASES.—Instances have come to notice where persons having infected animals in their herds have shewn ignorance of the law regarding notification of the existence of disease. In this connection it may be as well to reproduce section 12 of the Animals Diseases Consolidation Ordinance of 1904, which reads :—" Every person who shall have in his possession, or under his charge, or shall knowingly have on any land of which he is the proprietor, any animal infected with any destructive disease, shall keep such animal separate from all animals not so infected, and shall immediately give notice to the occupier of all contiguous lands (not being lands situate within the limits of any town or village) and as soon as possible thereafter shall also give notice to the Magistrate, or any Inspector or Sub-Inspector of Stock, or person specially authorised by the Administrator to carry out the provisions of this Ordinance within the district in which such animal is, or to the nearest Justice of the Peace, or Native Commissioner, that such animal is so infected, and, on failure to act in the manner directed, shall be liable to a penalty of twenty pounds, or to imprisonment with or without hard labour, for any period not exceeding three months, in default of payment.



"Aldsworth Bard," property of Mr. E. H. T. Mitchell, Bulawayo, runner-up for the 1,000 guinea trophy, Bulawayo Show, 1915. Age, 23 months.

Winner of 1,000 guinea trophy, Bulawayo Show, 1915. Shorthorn bull "Lomond," property of Mr. C. Drummond Forbes. Bred by Messrs Anderson Bros., Bethlehem, O.F.S. Born 23rd January, 1914

The Agricultural Shows.

THE BULAWAYO SHOW.

The Bulawayo Show was held on the 27th and 28th May, attracting, in addition to a large number of farmers from the surrounding district and various parts of Matabeleland, many visitors from the sister province of Mashonaland. Bulawayo is in the fortunate position of being able to exhibit cattle, and this section was, of course, the outstanding feature of the show. The quality of the entries perhaps tailed off somewhat, as compared with those of the previous year, but the leading exhibits were highly creditable.

One was a little disappointed with the grade oxen, which, as a whole, were not representative of the class of beast that can be, and is being, produced in the country, although individual specimens of merit were on view, notably a half-bred Shorthorn ox bred by Mr. E. A. Hull, which was utilised for the purposes of a weight guessing competition, and which proved to weigh 701 lbs. dead weight. Slaughter stock, of course, is more properly included in purely fat stock shows, and beyond forming an interesting example of the use of good bulls, their exhibition at such shows as the one under discussion brings little profit to the exhibitor. This factor no doubt accounted for the somewhat meagre collection seen. The cattle generally bore evidence of the continued appreciation of the Rhodesian stock-owner of the value of good stud stock and, what is perhaps of equal importance, of the value of good feeding. The condition of some of the animals was, in the expressed opinion of Mr. Alex. Holm, the noted Union authority, equal to that of animals raised and fed in the British Isles, and reflected the greatest credit on the owners. Most of our readers will, long ere this, have seen a detailed account of the prizewinners in the daily Press, but a few words on the leading exhibits will perhaps be of interest.

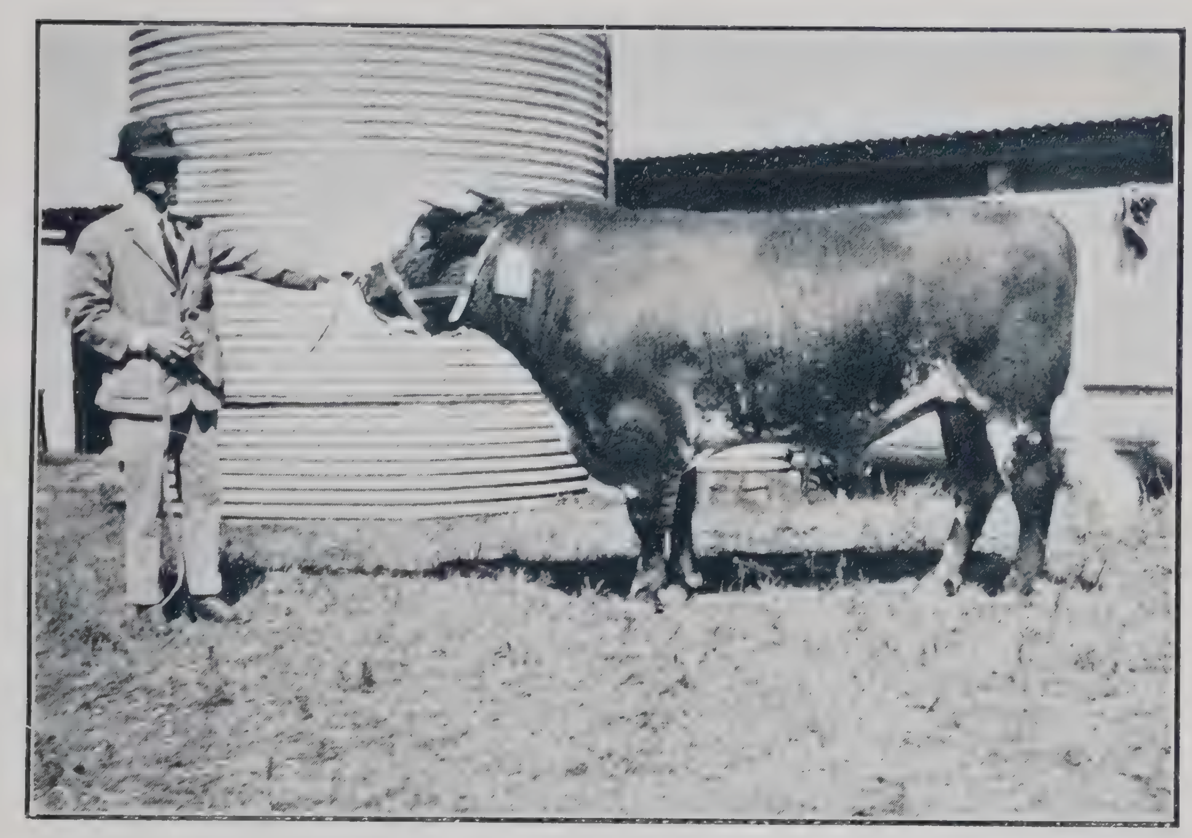
The winner of the Thousand Guinea Trophy, Mr. Drummond Forbes' Shorthorn bull "Lomond," bred by Messrs. Anderson Bros., of the Free State, was a grand specimen of the true Scotch type of beef bull. He would have carried a little more condition with advantage, but in shape and make he was worth carrying in one's eye when buying or breeding beef bulls. The runner up, "Aldsworth Bard," a Shorthorn bull of Booth type, recently imported by Mr. E. H. T. Mitchell, of Bulawayo, was undoubtedly a very fine animal. Mr. G. C. Woodforde, of Lanteglos, Gatooma, made a good fight for second place with his very beautiful Shorthorn bull "Prince Worcester," a roan Shorthorn of aristocratic dairy blood, which was imported some 18 months ago, and which has developed marvellously in the hands of Mr. Woodforde's feeder, Mr. Bird. "Prince Worcester" was first in his class, beating last year's runner up, "Plutocrat," the property of the British South Africa Co.

The 1914 champion, Mr. C. S. Jobling's Hereford bull "Devonby Dreadnought," has grown well, and has maintained his level frame remarkably well. He was first in his class for both imported and South African bred bulls. The senior honours for this breed went to Mr. J. Mack's bull "Peerless."

Red Lincoln Shorthorns were well represented by Messrs. Brebner & Self's massive bull "West Acre Beau," the best South African bred Shorthorn bull three years and over, and by some good cows exhibited by Mr. E. A. Hull. This breeder divided the honours in the female classes against Coates Shorthorns shewn by Mr. E. H. T. Mitchell and the British South Africa Co. The championship for the best Shorthorn female on the show, however, went to the British South Africa Co. Messrs. Coles & McKenzie, of Gwelo, gained the premier award for North Devons, while Mr. E. H. T. Mitchell, Messrs. Austin & Good and De Beers Cons. Mines, Ltd., won in their various classes.

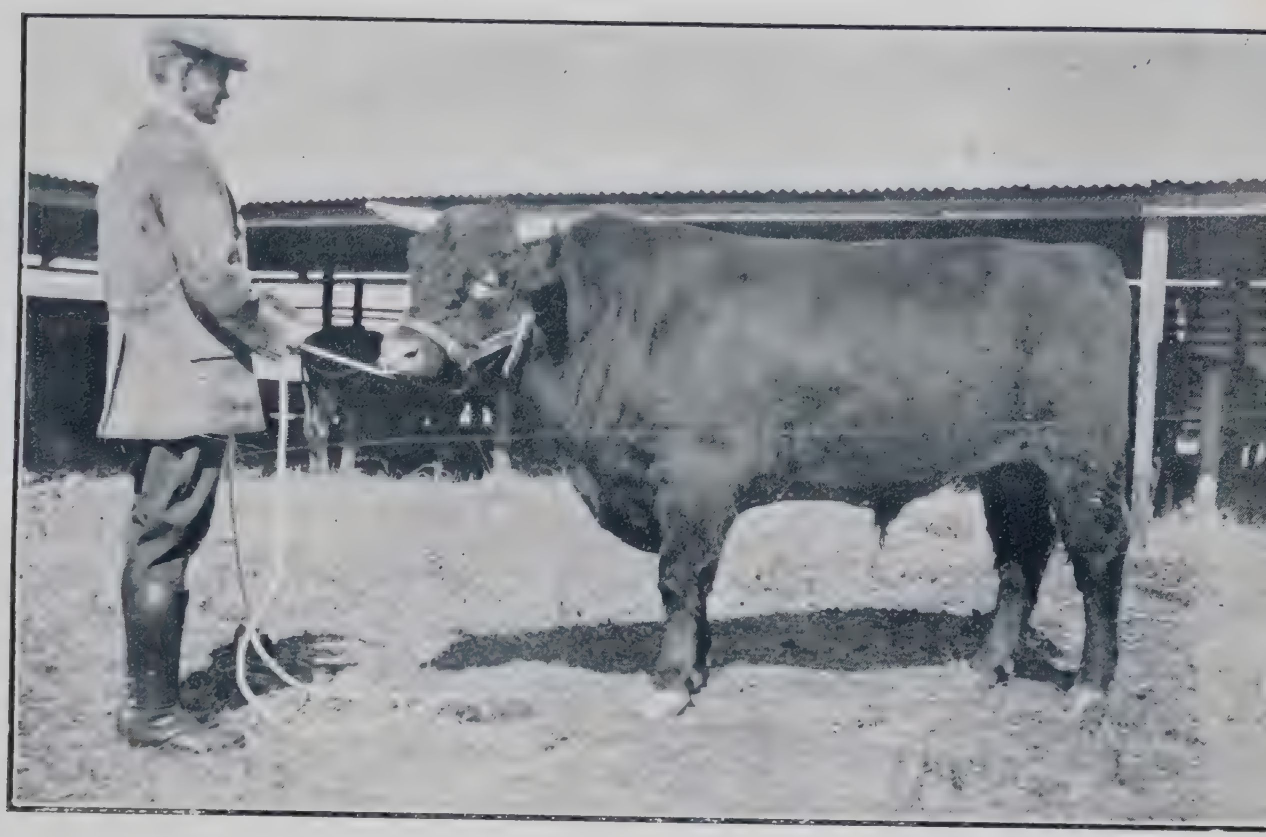
De Beers Cons. Mines, Ltd., were the only exhibitors of Sussex, and consequently carried off all the awards, with some very good animals.

Mr. H. P. Fynn, of Bembesi, provided the best Africander bull in the yard.



Mr. G. C. Woodforde's bull "Prince Worcester," born 16th May, 1912.

Mr. J. Mack's Hereford bull "Peerless," over three years. Bred by H.M. King Edward VII.



Mr. W. E. T. Bolitho's Shorthorn bull "Plutocrat," born 3rd February, 1912

Messrs. Coles & McKenzie's Devon bull "Highfield Buttermaker," born 27th October, 1913.

Frieslands were not a strong class.

The classes for sheep and pigs were not well filled. The most notable exhibit amongst the sheep was a number of woolled Persians, the property of Mr. F. D. Walker, of Bulawayo.

At the subsequent sales of stud stock, a record was created for Rhodesian-bred stock by the sale of the British South Africa Co.'s fourteen-months-old Shorthorn bull "Cherry's Boy," by "St. David," out of "Greenhead Cherry II." This bull, bred at Rhodesdale, went to Mr. G. C. Woodforde for 160 guineas. The bull is a very beautiful specimen of the beef type, and, if he develops sufficient bone, Mr. Woodforde should have something to say about the trophy next year. One of Mr. Hull's young pure-bred Red Lincolns fetched 60 guineas, and a number of very useful seven-eighths-bred bulls from the same breeder realised approximately from 25 to 35 guineas a head.

A most interesting feature of the show was a highly instructive and well-delivered lecture on cattle, their breeding, points, etc., by Mr. Alex. Holm, Under Secretary for Agriculture in the Union. Such lectures, illustrated as in this case by reference to the living animals, cannot but be of the very highest value to breeders and feeders alike.

The outstanding feature of the produce section was undoubtedly the maize exhibits. The classes were numerous and well chosen, and the prizes offered were substantial. Competition was keen in almost every instance, and the exhibits reached a high standard of merit in the case of the Hickory King classes. Mr. Bland's bag of seed maize and cobs and Messrs. Laing Bros.' 10 cobs of 8-row Hickory King are worthy of special mention, as being unusually good for Matabeleland. In one or two cases, maize in sacks was shewn which was damp—an absolute disqualification in the case of bagged grain. In the case of 10-row Hickory King, Mr. Hall's winning cobs shewed the improvement in size and weight that marks this variety from the 8-row type. The 10-row variety is eminently suited to the better class of soil in Matabeleland. In the Salisbury White classes, the entries were rather poor, and in some of the other classes there were no entries at all. One suggestion would not be out of place here. The competition for the heaviest yield of grain off 20 cobs is rather unprofitable, leading to no beneficial result to the farmer; on the other hand, the heaviest percentage of grain to cob is one of the most useful classes in any show, tending, as it does, to improved depth of grain at the expense of the core.

In the other produce classes, the entries were disappointingly small, although some were of great merit. One excellent exhibit of dhal hay, by Mr. Bradshaw, is the first we have seen in Rhodesia.

The exhibits of fruit, considering that they all came from a part of the country which can hardly be regarded as a fruit section, were fairly good, but very few in number.

It is to be regretted that the varieties were not separated into classes; for instance, the schedule called for twelve oranges, and the entries for this class included Washington Navel, some other named varieties and seedlings. The first prize was awarded to an exhibit of Washington Navel, and the second prize also went to the same variety, whereas, as a matter of fact, the best commercial oranges shewn were some seedlings, which should under any circumstances have received second prize, as the Washington Navels that were placed second were too large for commercial purposes, which is the standard all fruit should be judged upon.

Some fair apples were exhibited, but these were very badly graded.

Little or nothing has been undertaken in the way of citrus culture in this part of the country up to the present, principally on account of lack of water for irrigation, so that everything shewn was from *domestic* orchards, and really of little value from an export point of view.

Quite a useful collection of fruit was sent in, for exhibition only, by Mr. A. R. Crombie, which did him great credit.

One of the most interesting stands of an industrial nature was that of the Premier Portland Cement Co. (Rhodesia), Ltd., whose exhibit of locally-produced cement, and of articles manufactured therefrom, such as columns, slabs, tiles, watering troughs, bricks, etc., revealed very high possibilities in the beginnings of a new and very valuable local industry. The cement was submitted to several very thorough tests, and so far as such were observed, conformed with and generally exceeded the revised British standard specifications.

The woodwork exhibits of the Milton High School boys created very much interest, and the skill and industry shewn in the many serviceable and ingenious articles displayed reflected the greatest credit on the boys and their instructors.

The poultry section was well filled, a very successful exhibitor being Mrs. H. S. Logan, of Salisbury.

THE UMTALI SHOW.

The fourteenth annual show at Umtali was held on the 24th and 25th June, and as regards the quality of the exhibits, was undoubtedly a conspicuous success. Owing to restrictions, due to the prevalence of African Coast Fever in the district, it was only possible to include a few classes for cattle in the catalogue, but we sincerely hope that by the time the next show is held it will be found possible to remove these to a great extent. We congratulate the Umtali farmers on acquiring their own grounds and erecting a hall for show purposes, and feel sure that the stimulus this achievement must give will have a good effect in the future.

The produce shewn at Umtali has for many years been a notable feature of the show. The classes are usually well represented, and competition is keen. This year entries were fewer in most classes, with the notable exception of maize. In the maize classes nothing but praise can be bestowed on the great and steady annual improvement that is manifestly taking place. Premier honours again went to Messrs. McLean & Howie, who shewed in the Salisbury White and Boone County classes grain of particularly fine depth. Great care will, however, be necessary in retaining this desirable feature in the Salisbury White classes to prevent the cobs from becoming too much of the Boone County type. In the Hickory King classes several exhibitors shewed fine samples of this grain; in particular, Messrs. Macdonald Bros., Mr. R. W. Cockerell and Mr. J. Norris. Among other notable exhibits were Mr. Strickland's very fine barley and wheat, which were equal to anything of the kind shewn this season at the agricultural shows.

On the whole, the display of fruit was good, but it is to be regretted that so many entrants did not send in their entries, as had they done so, it would have about doubled the quantity actually exhibited. It should be pointed out that sufficient care in most cases had not been taken in picking, grading and staging the fruit. The fruit should in every case be carefully cut from the tree, and not pulled, and every fruit in each individual class should be of an even size, clean in texture, free from scale or other insects, or indications of it having been infested by such, as evidence of having been rubbed clean scores against the fruit as much as though the scale were actually present.

The class calling for a collection of citrus fruits was poorly filled, and none was worthy of a first prize, the varieties in many cases not being true to type. With regard to the boxes of oranges packed for export, none were really well done; in fact, the only box that had any semblance of having been "packed" was that awarded first prize. It might be suggested that in this class, *i.e.*, boxes of oranges packed for export, the entries should be delivered to the secretary of the show not later than three weeks before the date of the show, so that they would open up in the condition in which they would appear on the European markets; further, the box should come to the judge's hands absolutely intact, that is to say, it should not be opened, as the outside appearance and general neatness of package both count.

The Washington Navel oranges were rather disappointing, excepting those awarded first prize, which, considering they came from young trees, were very nice stock, of even size, good grain, juicy, fairly thin-skinned and of good flavour, whereas most of the other exhibits were coarse, raggy, and in some cases seeds were present.

None of the Mediterranean Sweet orange exhibits was of a sufficiently good standard to compete for the first prize, some being not true to type.

Produce exhibits, Umtali Show.

Old Cape oranges were small but good. Jaffa oranges from the Premier Estate were excellent, but others were not true to type.

Valentia Late oranges were a poor exhibit right through, the reason for which could not be understood, as some really first-class fruit of this variety is grown at several places in the district.

Oranges of other varieties produced some excellent seedlings, whilst others were thick-skinned, full of rag and deficient in juice. One lot of extra nice thin-skinned, fine-grained, juicy and full-flavoured oranges from Melsetter would have received a prize if properly shewn, but unfortunately they had been so badly picked as to have been minus a considerable piece of skin around the stalk end, and otherwise bruised, so that they could hardly be accepted as merchantable fruit.

Naartjes shewn by Mr. A. Strickland were an excellent exhibit. In this class a considerable quantity of fruit was infested with Citrus Codling Moth.

The lemon classes produced few good samples, excepting those sent in by the Premier Estate, which were really good, while the grape fruit was a poor class right through.

It might be suggested that each exhibit of fruit should consist of twelve samples instead of six, as called for in the schedule of prizes. This applies also to the collection of fruits, *i.e.*, twelve specimens of each variety should be shewn in every class.

Taking the fruit section as a whole at this show, the arrangement and general quality of the fruit were in advance of that seen at any other show.

In the cattle section, Mr. J. T. English secured successes with his Friesland bull, which was placed first in the classes for the best bull over two years old, dairy breed, and the best bull over two years, dual purpose; while he also won the cup, given by Mr. C. D. Wise, for the best bull on the show. This bull was imported from Germany two years ago, and belongs to what is known as the Wessermarsch breed of Frieslands, and is more of a dual purpose type than the Frieslands usually met with in South Africa.

The section for pigs was poorly represented, but Mr. P. G. Smith exhibited a Middle Yorkshire, which Mr. Neale, manager of the Bacon Factory, stated was one of the finest specimens of bacon pigs he had seen in South Africa.

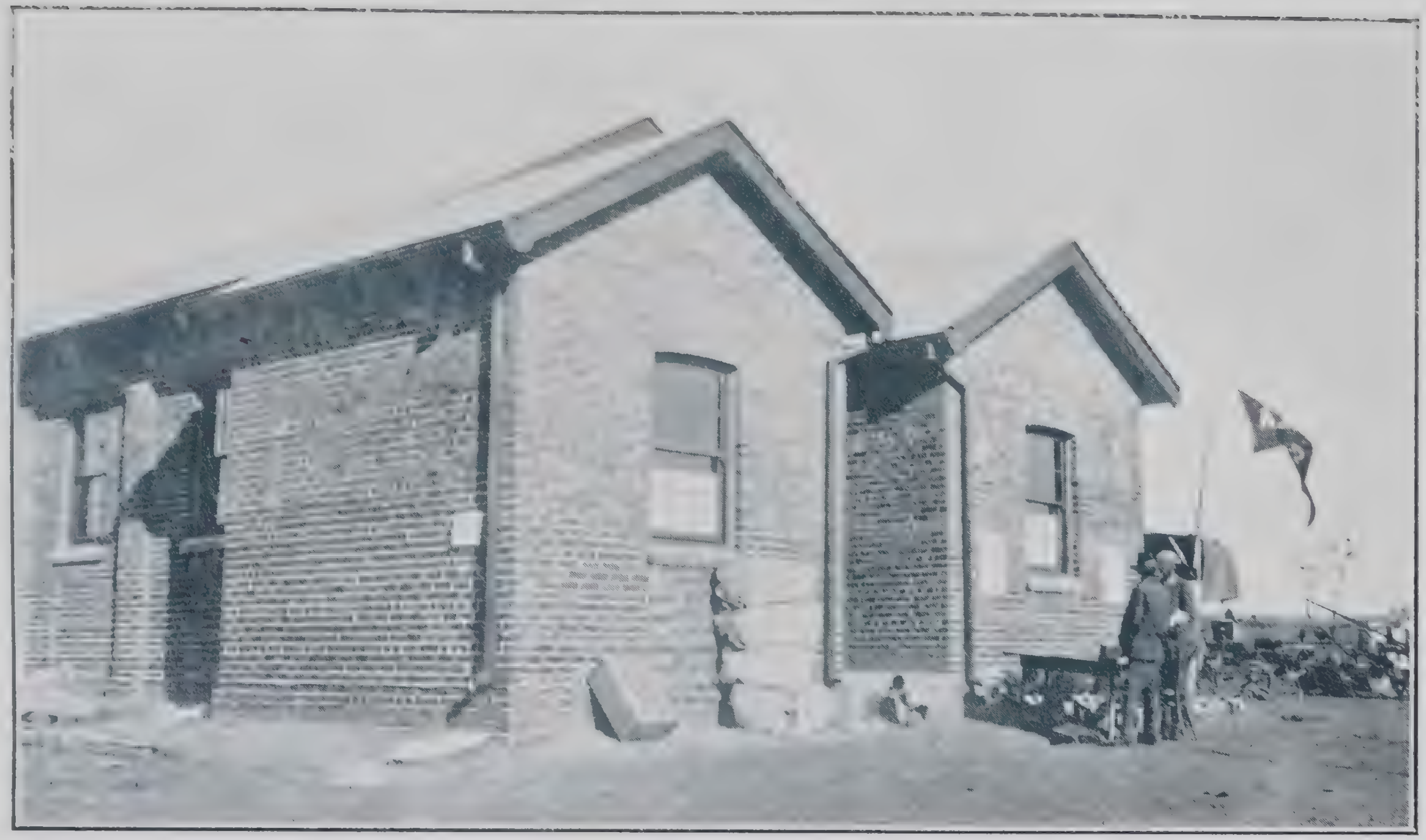
Interesting exhibits were samples of bread made with 50 per cent. of mealie meal. The bread, which was made by the porridge method, was palatable and quite suitable for domestic consumption.

THE MAZOE SHOW.

With commendable enterprise the Mazoe farmers organised a show this year, which was held at Glendale Siding on the 8th July, and it is gratifying to record the success achieved in this initial effort. The variety and quality of the exhibits and the general arrangements of the show reflected the greatest credit on all concerned, and we trust the executive will endeavour to make this an annual event in the future. As was the case at Umtali and Salisbury, African Coast Fever restrictions prevented the exhibition of cattle, and all energies were therefore devoted towards illustrating the agricultural possibilities of this favoured district, which object, as stated, was successfully attained.

Mazoe is one of the leading maize growing centres of Rhodesia, and the committee is endeavouring to make this the premier maize show of the Territory. The maize classes were exceedingly comprehensive, and the number of entries reached the gratifying total of over 200. It is obvious that to be a prize-winner in a show of this kind is no easy matter, and Mr. Cole Kemsley is to be congratulated upon obtaining the gold medal for the highest total of points in the maize classes. In the single-ear classes, very fine cobs were shewn throughout. This class constitutes a test of the farmer's ability to select his best cobs for seed. The uniformity class of ten cobs, which was a new and valuable feature in the maize classes at this show, is a test of the degree of uniformity to which the farmer has brought his seed. The other classes of five bags of seed and 50 lbs. weight of grain for export were keenly contested, and constituted a striking exhibit of the maize possibilities of the

Mazoe Show; judging ladies' hacks.



New Farmers' Hall, Glendale.

district. A class for maize plants, and one for percentage of grain to ear, completed the maize section. In this latter competition, a considerable surprise was occasioned by the fact of the Salisbury White variety shelling out better than the Hickory King. Mr. F. C. Peek's twenty cobs gave a grain return of 89.5 per cent.—the highest we believe yet recorded for Salisbury White. The number and arrangement of classes in the maize section are well worth the attention of other show committees.

In the other produce classes there were frequently over a dozen entries. Among the classes thus well represented were beans, ground nuts, potatoes and pumpkins, and in each case the competition was so keen that great excellence characterised the winning entries. A special exhibit of winter-grown soft wheat (Wol Koren), put on by Mr. Hefer, attracted much attention, and an exhibit of the fibre of Hibiscus cannabinus, both raw and finished, reflected great credit on Mr. Garvin and Mr. Lionel Noakes, who must have taken great pains in demonstrating its possibilities.

On the whole, the produce at this show was the best we have yet seen in Rhodesia, and if this high standard is maintained in future, it is destined to become one of the most important shows in the country.

With regard to the fruit exhibits, Mr. R. G. Garvin and the Mazoe Citrus Syndicate are to be congratulated on the excellent samples of oranges, naartjes and lemons sent in by them for exhibition only. The competitive classes were unfortunately not very well filled, but it is anticipated that in the course of a year or so this show will produce keener competition in citrus fruits than anywhere else in this Territory. The fruit was practically all from young trees, so that one could not look for nice silky-skinned fruit, which can only be attained as the trees get into full bearing. The general conditions of many parts of this district are as suitable as any localities in Southern Rhodesia for citrus growing, so that later some really good exhibits may be looked for. The same remarks regarding the number of fruits to be sent by each exhibitor for each class apply here as at Umtali. There was nothing remarkable about the best collection of citrus fruits, which might, however, have shewn up to better advantage had more specimens of each variety been called for. Mr. R. G. Garvin's Washington Navel oranges were a fair sample from young trees, while the Mazoe Citrus Syndicate's exhibit of Valentia Late oranges was very nice. The seedling oranges were poor; naartjes were quite good, while the lemons sent in by Mr. R. S. Newett were really excellent. The class for grape fruit produced some quite nice flavoured fruit, although it was deficient in juice and contained too much rag. The fruit shewn should have been, on the whole, more carefully picked and more evenly graded, as some exhibits had stems an inch or two long, while others had been pulled, and not cut.

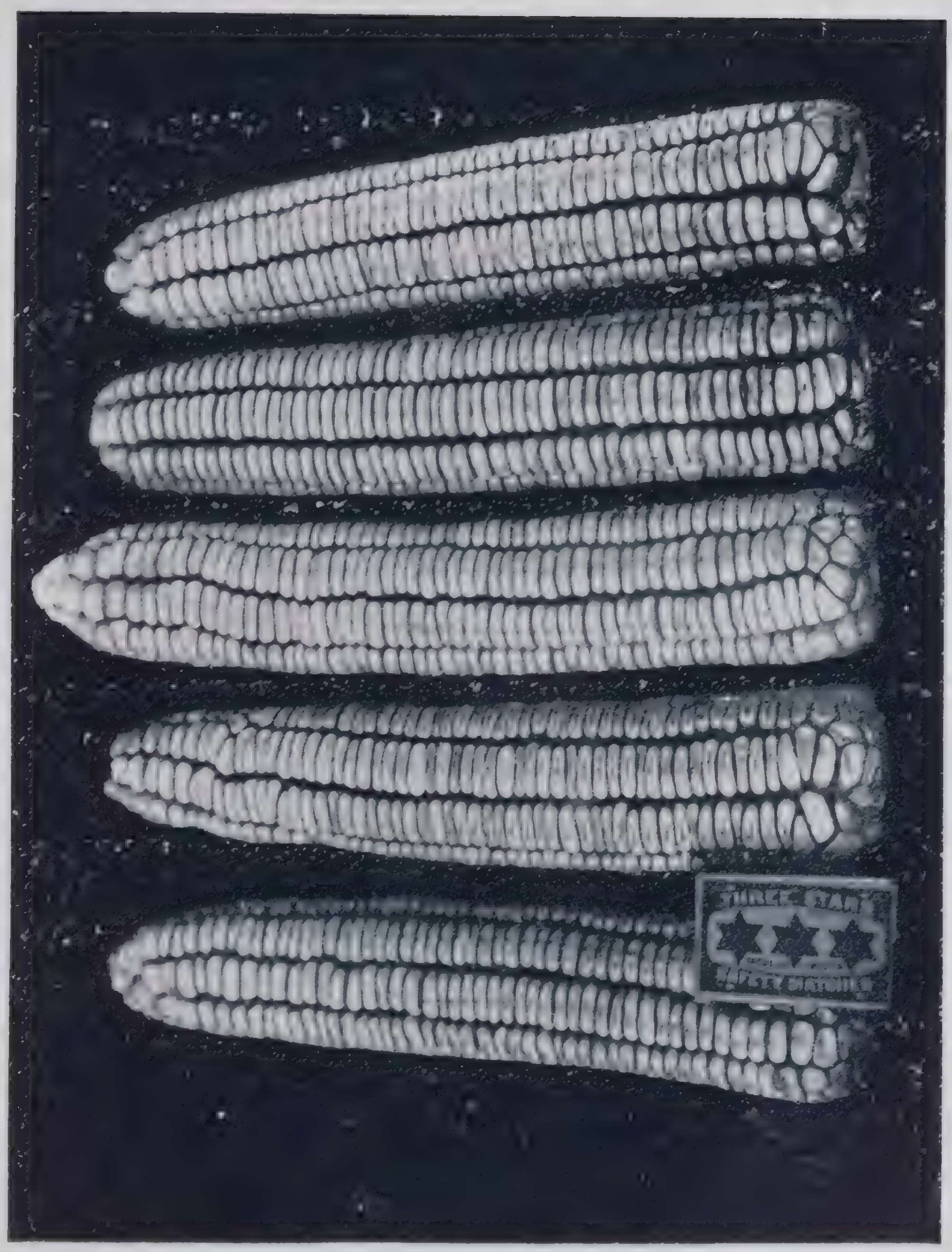
The exhibits of pigs were few in number, but two were of very fair quality. There was nothing of outstanding merit in the sheep and goats section, while the poultry exhibited was generally of very fair quality. We would congratulate the Mazoe ladies on the needlework and cookery exhibits, which would have been a credit to any show.

THE SALISBURY SHOW.

The Salisbury Show was held on the 15th and 16th July, and in view of the fact that it was again impossible to include cattle in the catalogue, the committee is to be congratulated on reviving the show in spite of the adverse circumstances.

In many respects the produce section was not as well patronised as it might have been, and quite frequently there were no entries at all in a class. This is much to be regretted, as the prizes offered alone should have been a sufficient inducement to attract exhibits. In marked contrast were the association displays put on by the Makwiro and Mazoe Associations in the competition for the cup offered by the society. These exhibits were most carefully got together, and in both cases shewed to the full the agricultural activities of the two centres. The managing body in each case had been the committee of the Farmers' Association, and it is a matter for regret that other associations failed to see their way to participate in the contest, which was won by the Mazoe Association. In

H.H. the Administrator opening the Salisbury Show.



Prize-winning cobs of 8-row Hickory King at the Agricultural Show, Salisbury. Exhibited by Mr. J. Dawson.

the maize classes there was good competition throughout, and two of the winners are worthy of special mention, viz., Mr. Dawson, with his 8-row Hickory King, and Messrs. McLean & Howie, with their Salisbury White. The maize reflects great credit throughout on the exhibitors, and it is obvious that the importance and possibilities of this premier crop are being realised by the farmers of the country.

The various exhibits of citrus fruits shewn in the Mazoe tent for the inter-district competition were a great credit to the district in general. With regard to the section for fruit, this was the weakest display of any of the shows, which is greatly to be regretted, as it was felt that this show should have produced the best exhibits in the Territory. Further, as suggested in regard to the Umtali Show, the schedule should call for twelve samples of fruit in each class.

It must be stated that the judging in many cases left much to be desired. For instance, in the class for best other named variety oranges, some very good Valentia Lates and Jaffas were shewn, but neither was awarded a prize, the first prize being given to a very poor class soft fruit, which was presumably not even intended to have been staged. The Washington Navel oranges were a poor exhibit, none of which should have been awarded a first prize. The class for seedling oranges produced some good fruit, especially an exhibit from the Premier Estate, which were without exception the best oranges on the show, but were entirely ignored by the judges, whereas the exhibits awarded first and second prizes were poor stuff, except for purely local purposes. They were, moreover, badly picked and graded, although sweet and otherwise quite good oranges, but too soft. Naartjes were a poor exhibit.

A collection of sixteen varieties of citrus fruits from the British South Africa Co.'s Marandellas Estate was good, and would have made a really excellent exhibit had the exhibitor been allowed to table a full setting instead of one fruit of each variety.

Some excellent lemons were shewn, but were so mixed up as to have lost their identity; an outstanding feature of this class was an exhibit of Genoa lemons from Mr. A. S. Leresche, which would have been hard to beat at any show in the country.

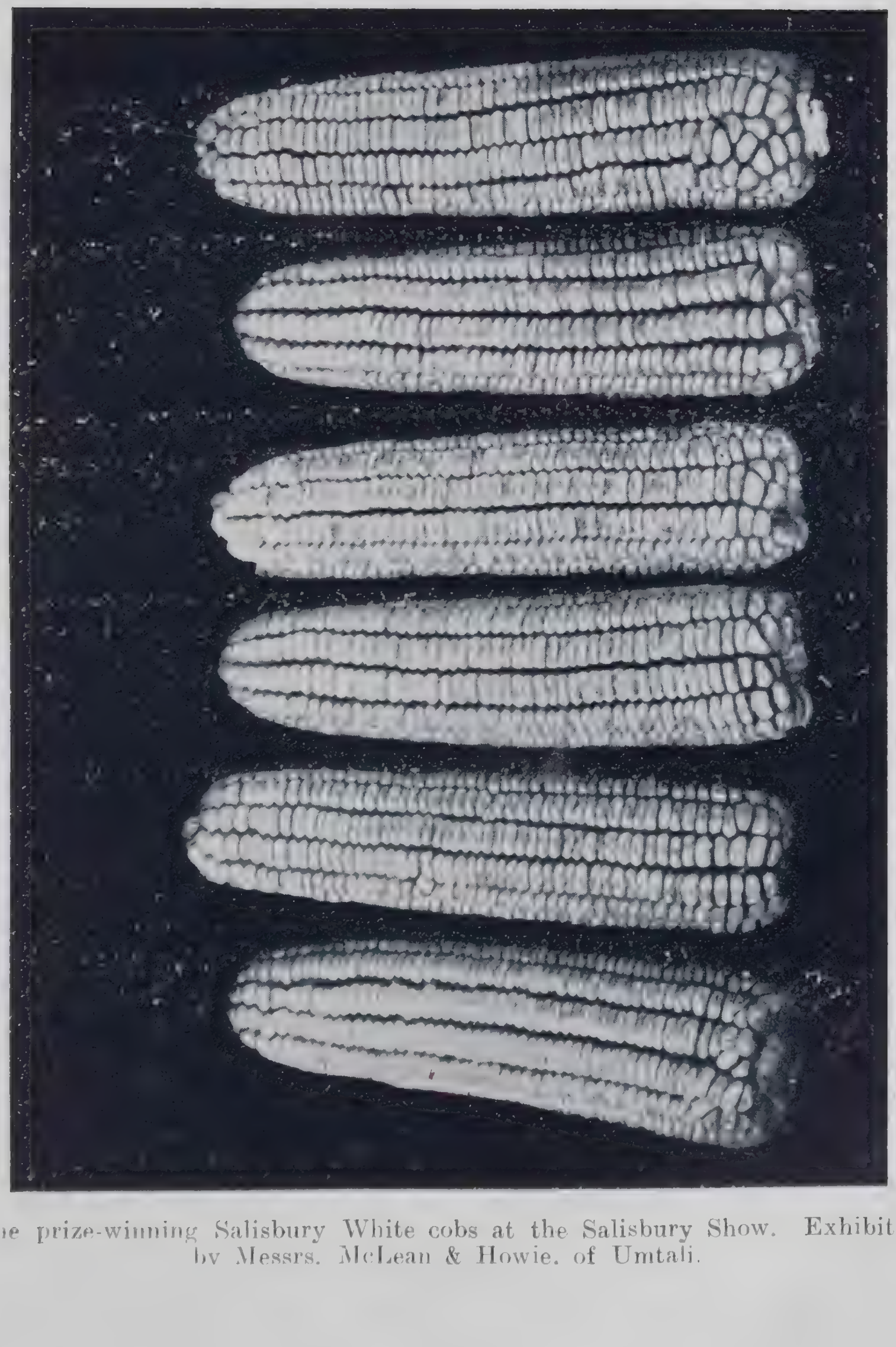
A box of 200 oranges, from the Premier Estate, Umtali, for exhibition only, had been incorrectly sized, while the fruit was too soft. The pack would never have held up for export oversea.

The slaughter stock section was represented by one entry only, consisting of four bullocks, the property of Mr. A. W. Partridge, of Lendy Estate. As is usual with Mr. Partridge's exhibits, these cattle were well fed and conditioned. The winner, 2½ years old, a half-bred Hereford beast, weighed 1,000 lbs. alive and 604 lbs. dead, thus shewing a fraction over 60 per cent. of carcase to live weight. It is a great pity that year after year there are so few farmers who will seriously enter the lists in this class of competition, and we are sure that no one regrets this more than does Mr. Partridge.

There were rather more pigs than usual on the show, and on the whole the quality was very fair. Messrs. Jennings & Logan and Mr. Pascoe shewed some good quality Large Blacks. The cup for the best pig on the show, however, was won by Mr. F. A. Strobel, with a good Berkshire boar. There was evidence that an interest is being awakened in bacon production, and two or three good pens of pigs were shewn. While we do not wish to detract from the credit due to the exhibitors who come forward in these bad times to support the show, we would still emphasise the necessity for more thought and care in the preparation of pigs for show purposes.

The sheep exhibits were few in number, but excellent as regards quality. Mr. J. J. Black was the most prominent exhibitor, and the principal prize taker. He shewed a number of cross-bred sheep, and perhaps the most striking lot was a pen of second-cross Shropshire merino lambs, which were most satisfactory from both a mutton and a wool point of view. The Mercantile Agency shewed one or two really first-class Persian and Africander rams, and Mr. Partridge provided the prize-winning slaughter sheep with two pens of Persian type animals. Messrs. Jennings & Logan were successful among the goat classes.

The poultry section was well up to the average as regards the number of entries, but the quality of the exhibits was hardly up to the standard of last year. Rhode Island Reds, both single



The prize-winning Salisbury White cobs at the Salisbury Show. Exhibited by Messrs. McLean & Howie, of Umtali.

and rose comb, Black Minorcas and Silver Laced Wyandottes were strongly represented, but in the classes for the more popular varieties—White, Brown and Black Leghorns, White Wyandottes and Buff Orpingtons—the entries were surprisingly small. The White Leghorn classes in particular were very poorly supported, and the cock class of only three entries compared somewhat unfavourably with the entry of eight at the Mazoe Show.

Many of the birds were shewn in excellent condition and good colour, especially the White Wyandottes, which, without exception, had been well washed and brought up into show condition. In these classes we were pleased to see some of last year's prize winners. Mrs. J. M. Jeffrey's bird, which last year as a pullet gained the special prize for the best bird on the show, carried off the special prize for the best Wyandotte. In Mr. R. Haddow's cock bird we think we recognised last year's second-prize winner in a very strong class. The colour and condition of these two birds, and also of the unsuccessful birds in the hen and pullet classes, were really good.

The special prize for the best bird on the show was gained by Mrs. H. S. Logan's Black Orpington cockerel, a bird of good size and shape, in good condition and possessing good feet and legs, but the sheen was poor. Mrs. H. S. Logan also won the special prize for the best bird in the light breeds with a typical English White Leghorn hen, a bird of good size and shape, good head and points, but of poor colour and not up to condition.

The Buff Orpington classes were not well supported, and although the colour was only moderate, many of the birds were of the true Orpington type, notably Mrs. Raleigh Grey's winning cockerel.

The Silver Laced Wyandottes were very strong. In the cock and cockerel classes we noticed several birds of good size and shape and fair lacing. The birds in the pullet class were a very even lot, and Mrs. M. H. Ramsey's winning bird was of good type, but rather on the small side.

The turkeys were good, and had they been more satisfactorily penned, would have made a show themselves. The majority were large, deep-bodied birds, in good condition, and many of the American Bronze shewed good wing pencilling.

African Coast Fever.

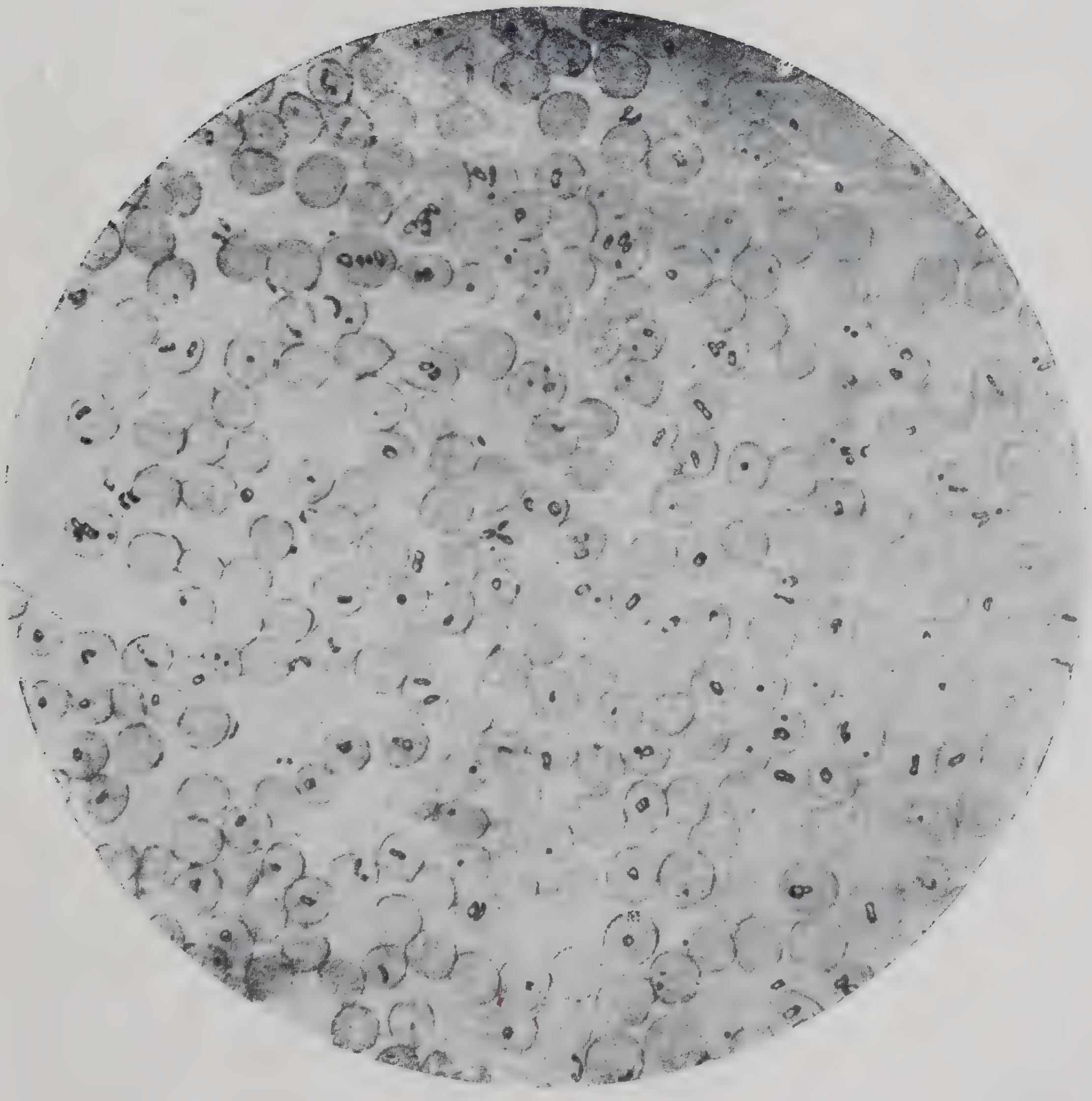
By L. E. W. BEVAN, M.R.C.V.S., Government Veterinary Bacteriologist.

In view of the recent serious extension of African Coast Fever in parts of Mashonaland, it has been thought desirable to again publish a few notes for the information of stockmen who have had no previous experience of this much dreaded disease.

HISTORY.—East African Coast Fever—or, as it is commonly called in this country, African Coast Fever—was first introduced into Southern Rhodesia during the latter part of 1901, with a number of cattle shipped at Dar-es-Salaam for Beira and Delagoa Bay. These were the balance of a large mob of susceptible cattle brought down from the high veld in German East Africa to the coast, where the disease is enzootic, and where they became infected.

It is alleged that on the voyage south a large number died, and the carcases were thrown overboard. Some of the survivors were landed at Beira, and the ship went on to Delagoa Bay. Of the lot landed at Beira, several truck-loads were sent by rail to Umtali, and two loads went on to Salisbury. The disease broke out amongst both lots, but its true nature was not recognised; and from these centres it extended over the main transport roads of Rhodesia, and also to many farms adjacent to the roads.

During the first few years, the losses from the disease among stock owned by Europeans were enormous, and it was estimated that some 95 per cent. of all infected animals died. No remedies were found of any avail, and to this day no successful curative agent has been discovered.



Micro-photograph of typical blood smear of African Coast Fever. [From Journal of Comparative Pathology and Therapeutics.]

It may be remarked that the number of outbreaks among cattle owned by natives was small, compared with those among European stock.

During the years 1904 and 1905 the disease abated, probably by reason of the fact that most of the cattle on the infected roads and farms had succumbed. Since then the veterinary measures, based upon a more exact scientific knowledge, have been successful in limiting the disease to a few isolated outbreaks.

In Matabeleland no cases have occurred during the last two years, and although Mashonaland has been less fortunate, it is confidently believed that if stock-owners would understand and conscientiously adopt the methods recommended by the Veterinary Department, African Coast Fever would soon cease to exist in Southern Rhodesia.

Cause of the Disease.—African Coast Fever is essentially a disease of bovine animals, and is caused by a minute parasite (*Theileria parva*) which undergoes development partly in the tick and partly in the ox. Having been taken up by the tick from an infected animal, it undergoes sexual multiplication, giving rise to certain spore-like bodies which are inoculated by the tick into the animal it bites. These first establish themselves in certain organs, such as the lymphatic glands and spleen, where they invade the white blood-cells, in which they undergo non-sexual division, producing the so-called "Koch's bodies." These break up into a number of small parasites which invade the red corpuscles, with which they are taken up by the ticks feeding upon the ox at that time, and in certain species of ticks undergo further development. At the height of the disease in the ox, some 75 per cent. of the red corpuscles are invaded, but since there is little reduction in the number of the red cells, it is assumed that the parasite does not bring about their destruction, although it may obtain nourishment from them. It is also probable that the principal injury to the host is caused by the toxic materials produced by the parasite.

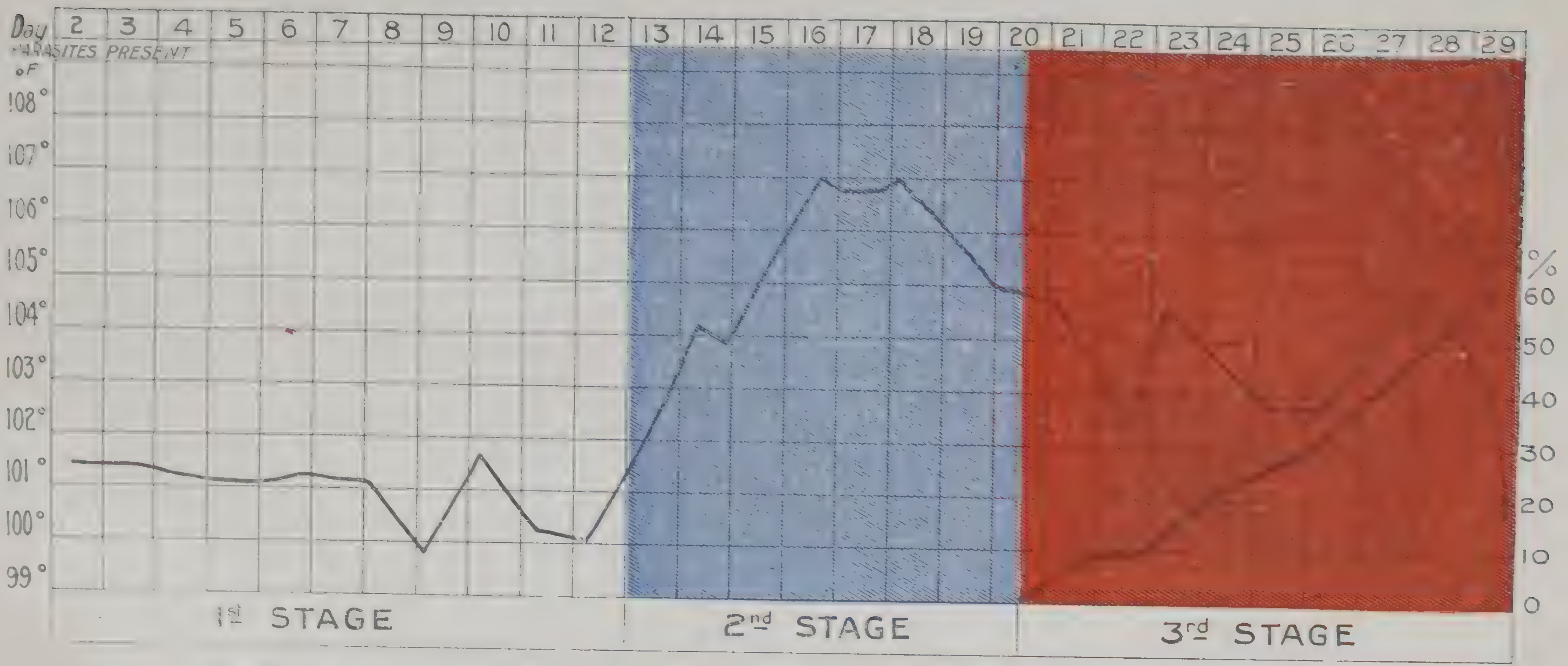
Although numerous parasites may be present in the blood, the disease cannot be transmitted from an infected to a susceptible animal by blood inoculation from one to the other. The reason is that the parasites in the blood are non-sexual forms, and incapable of undergoing further development in the ox. It is believed that if an animal recovers, the particular parasites in it die out, and it is on these grounds that the "salted" animal is assumed to be incapable of perpetuating the disease.

INCUBATION AND COURSE OF THE DISEASE.—From the time the tick introduces the parasite into a susceptible animal, an interval of from ten to twelve days elapses before the first manifestation of the disease, namely, a rise in temperature. About this time or shortly after, the so-called "Koch's bodies" can be detected in the glands and spleen. A further period of from three to eight days elapses before parasites appear in the blood, during which time the animal becomes visibly sick. The number of cells invaded by these parasites increases daily, and towards the end of the disease up to 75 per cent. may be involved. The average time from the day of infection until death is about thirty days.

The coloured diagram given, which may be taken as representing the usual course of the disease, may help to make this explanation clear. In it the uncoloured portion represents the first stage, when the disease cannot be detected by the microscope or by clinical observation; the blue portion is the second stage, when the temperature is elevated and "Koch's bodies" are present, but no parasites in the blood: the red portion represents the third stage, when parasites are present in the blood and can be taken up by ticks biting upon the animal. Thus the third stage is the period of danger.

Although the chart is typical of the majority of cases and can be taken as a basis upon which to apply the preventive measures about to be described, cases running an unusual course are frequently met with. For example, in a herd under careful observation where the temperatures are regularly taken, cases are met with in which the temperature rises, but returns to normal after a few days. In these cases a relapse may occur after several weeks, and the animal may die: or there may be no relapse and the animal may recover. Such cases have been more numerous since systematic dipping has been practised as a method of suppressing the disease. It has been shewn by experience that in animals habituated to arsenic by constant dipping, the infective processes are retarded and the

CHARACTERISTIC CHART OF AFRICAN COAST FEVER.

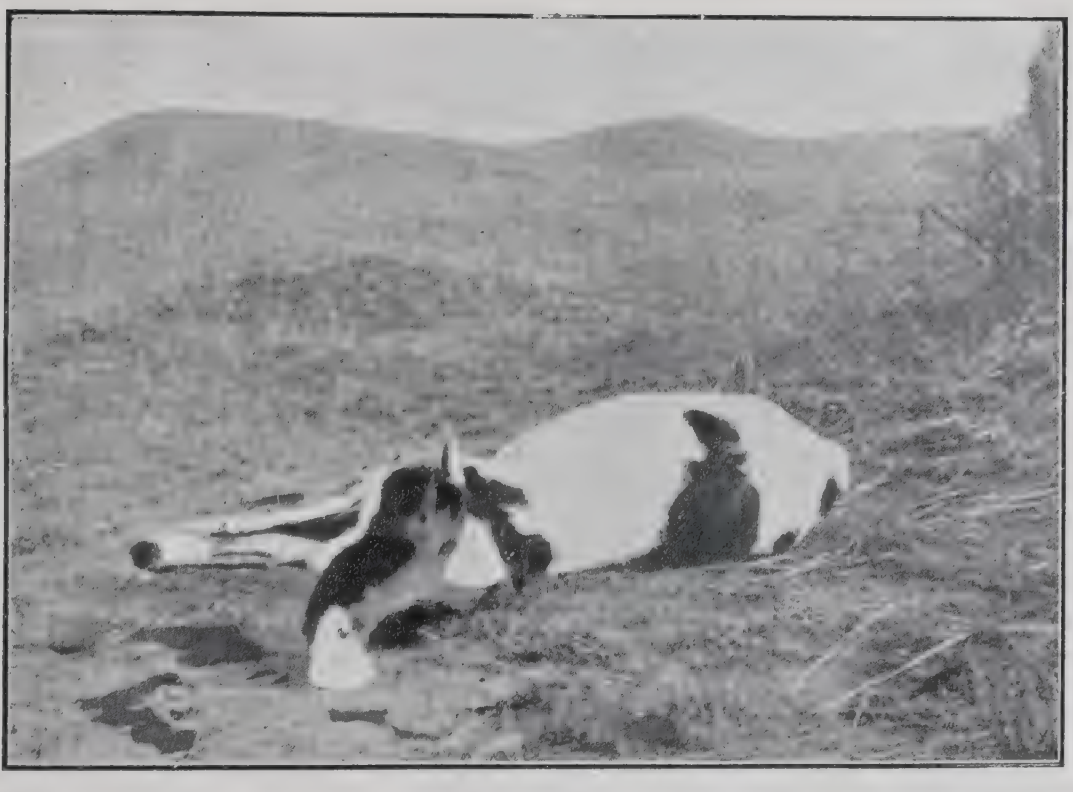


The Chart shews the body temperature of a cow infected in England by ticks sent from South Africa.
The thin black line indicates the temperature record.
The rise in the percentage of infected red-blood-cells is indicated by the heavy black line.

Stage 1. The period of incubation.

Stage 2. The period when the temperature is elevated, but parasites are not present in the blood. "Koch's bodies" may be found in the spleen and glands.

Stage 3.—The period when the parasites are present in the peripheral blood.



Photograph of an animal dead from African Coast Fever, shewing froth at the nostrils.

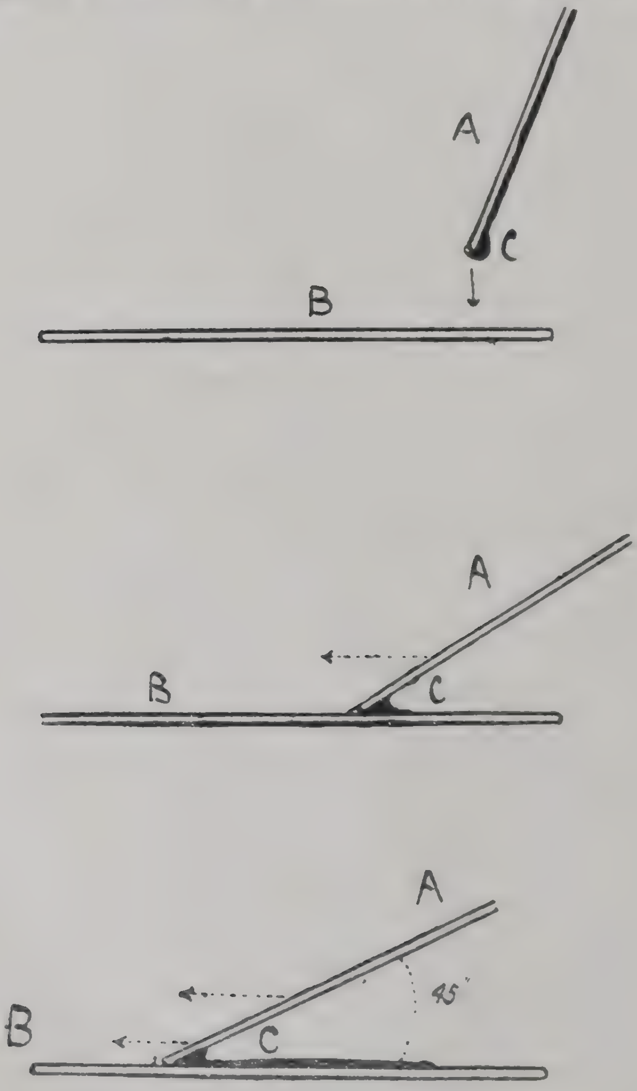
average period of incubation may be extended to sixteen days, but it is now clear that it exerts other influences upon the course of the disease which cannot be fully explained.

SYMPTOMS OF THE DISEASE.—(a) *Symptoms during Life.*—The first indication is a sudden rise of temperature, which may reach 107 degs. F.; but, notwithstanding the fever, outward indications are rarely met with before the last few days preceding death. These are not very distinctive, but the sick animal may evince one or more of the following symptoms:—Dulness; falling-in of the flanks; running from nose, eyes and mouth; a husky cough; swelling of the glands; weakness of the loins; staggering gait and a tendency to lag behind the herd; constipation, followed by diarrhœa; and there may be blood in the fæces. The tissues around the eyes may be swollen and the eyes appear sunken. Frequently the sick animal will continue to feed until the disease is advanced; finally, however, rumination ceases and appetite is lost. When the lungs are involved, the animal will grunt when walking downhill, and there may be distress in breathing.

(b) *Post-mortem Appearance.*—The most important lesions are:—Yellow discoloration of the fat; enlargement and congestion of the glands, especially of the throat and neck; alteration in the blood, indicated by small blood spots or hæmorrhages on the surface or lining of the heart, on the serous membrane and in the gall-sac and bladder.

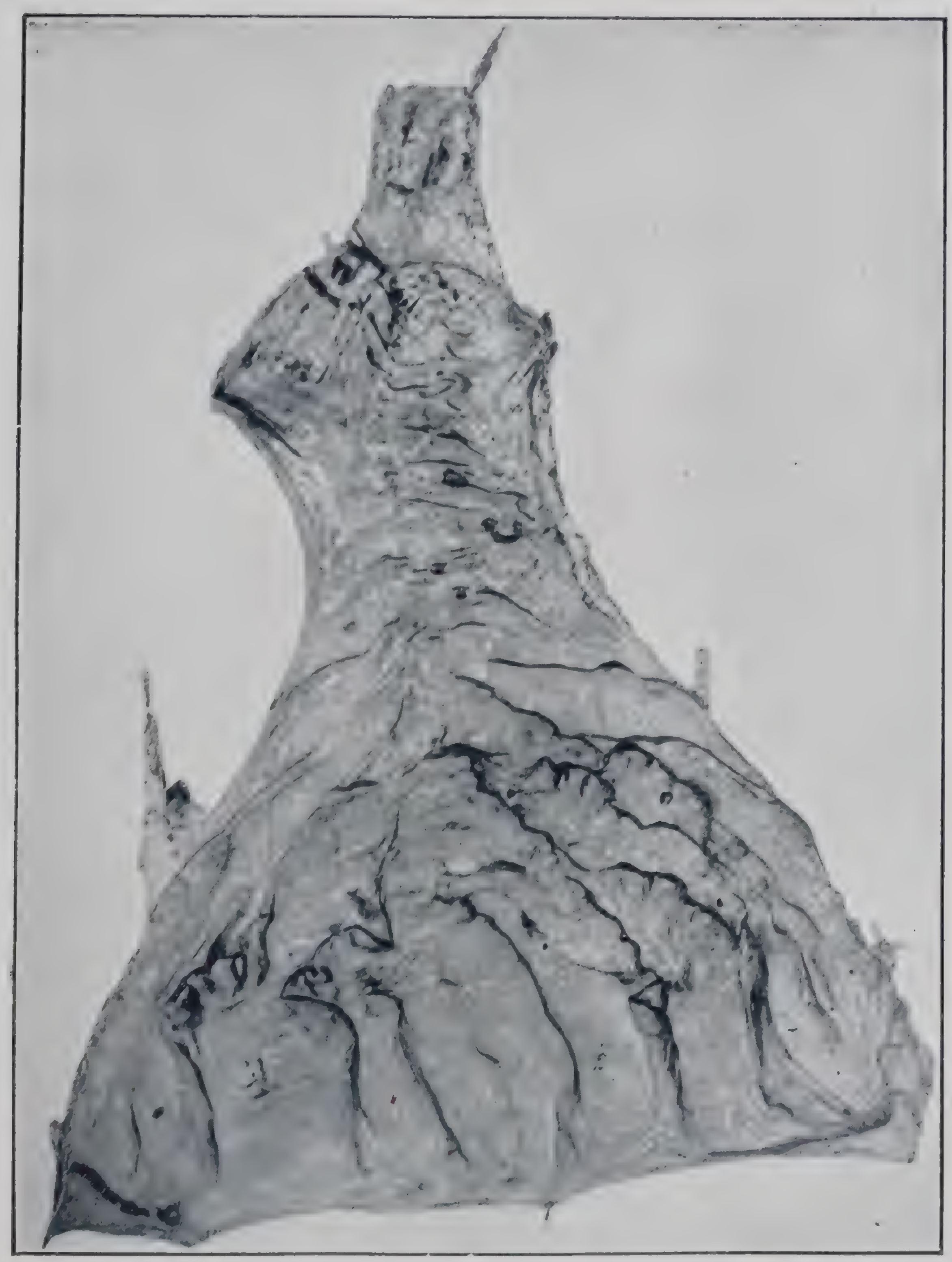
In a great many cases the lungs are affected, being dark in colour and infiltrated with straw-coloured fluid, which collects between the lobules or escapes into the chest cavity. This material in the air passages becomes whipped up into a foam, which passes up the wind-pipe and escapes by the nostrils, as in the photograph. The lining of the fourth stomach or abomasum is inflamed and frequently ulcerated; and blood spots are met with here and throughout the intestines. Small white, yellow or purple spots varying in size from a pin's head to a pea, known as infarcts, are seen as small elevations or depressions on the surface of the liver and kidneys. When cut into, they are generally triangular or conical in shape, the base being on the surface and the apex in the depth of the organ. These infarcts, when present, are almost diagnostic.

(c) *Microscopic Examination of Blood and Tissues.*—When by reason of the symptoms before or after death the animal is suspected of African Coast Fever, confirmation may be obtained by the microscopic examination of the blood and organs for the specific parasite. If the animal is dead, a small drop of blood should be placed upon a piece of flat clear glass and spread in the manner shewn in the drawing. The film of blood should be so thin that it will rapidly dry in the sun, so that when viewed under the microscope the red cells may be seen deposited in the single layer and the parasite in them may be clearly distinguished. But, in order that the diagnosis may be more certain, in all cases a little of the spleen pulp

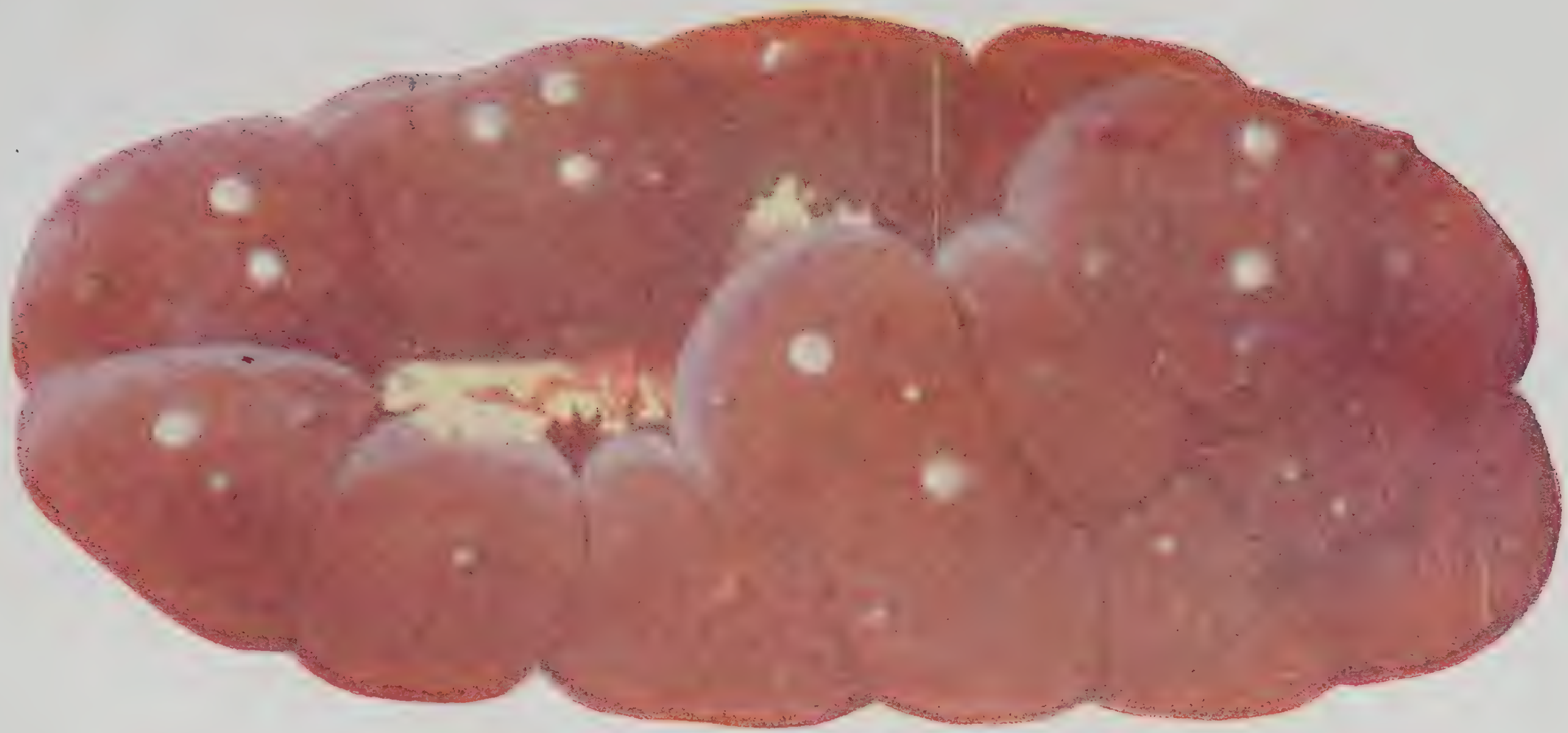


A first slide. B second slide. C drop of blood.

Method of preparing a blood smear.



Photograph of the stomach (*abomasum*) of an animal which died from African Coast Fever, shewing characteristic ulcers. (Photograph by R. J. Stordy, Principal Veterinary Officer, British East Africa.)

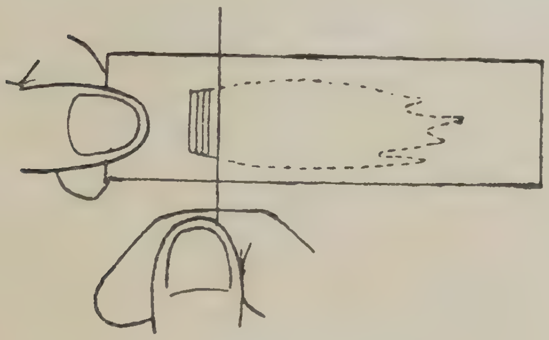


Kidney from case of African Coast Fever, showing the areas of Necrosis (Infarcts) in various stages.

[From Pamphlet by W. Robertson, M.R.C.V.S., issued by the Government of the Cape of Good Hope.]

should be spread thinly on a glass in order that search may be made for "Koch's bodies," which are diagnostic of the disease. If the animal is still alive, the hair from the edge of the ear should be clipped off and the ear washed and dried. The margin of the ear should be cut with a clean pair of scissors or knife, or one of the veins which are prominent just below the skin may be pricked with a needle. After a little blood has escaped, a drop should be collected on the glass and treated as described above.

Drop of blood on glass



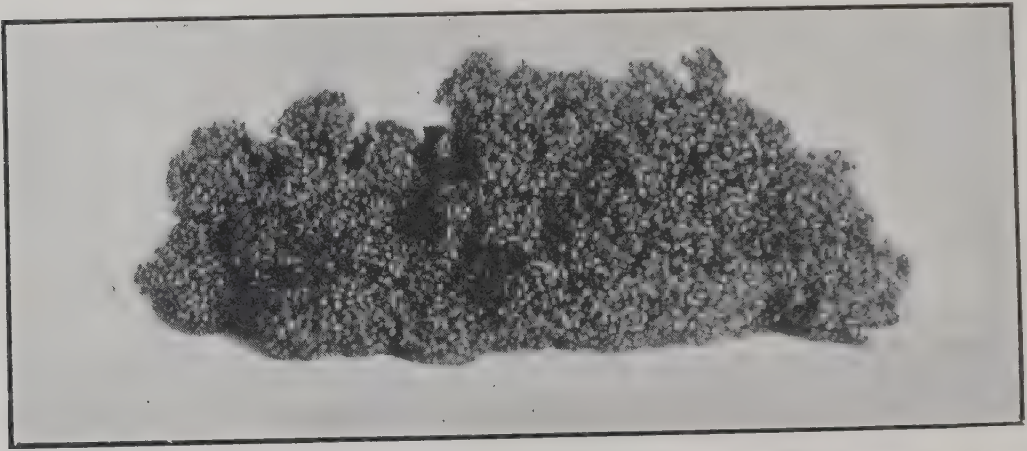
The same spread out into a thin film.
Another method of preparing a blood smear.

Several labelled preparations should be sent from each case. The thinner the film, the better for examination. The glasses should be wrapped separately in soft paper, and should be packed carefully in a tin box and forwarded without delay, together with the fullest particulars concerning the case, to the office of the District Veterinary Surgeon. Duplicate preparations may also be despatched direct to the Government Veterinary Bacteriologist, Salisbury.

Transmission of the Disease.—African Coast Fever is not directly contagious; a sick animal will not infect another susceptible animal by contact or by the excretions or fluids of its body. The disease is only transmitted by the bite of certain species of ticks, namely: *Rhipicephalus appendiculatus*, or brown tick; *Rhipicephalus evertsi*, or red-legged tick; *Rhipicephalus simus*, or black-pitted tick; *Rhipicephalus capensis*, or Cape tick; *Rhipicephalus nitens*, or shiny brown tick. Of these, the brown tick is the chief offender, and methods of controlling the disease are principally based upon a knowledge of its habits.

There are four stages in the life cycle of ticks: (1) eggs; (2) larvæ or seed ticks; (3) nymphs; (4) adults or sexual ticks.

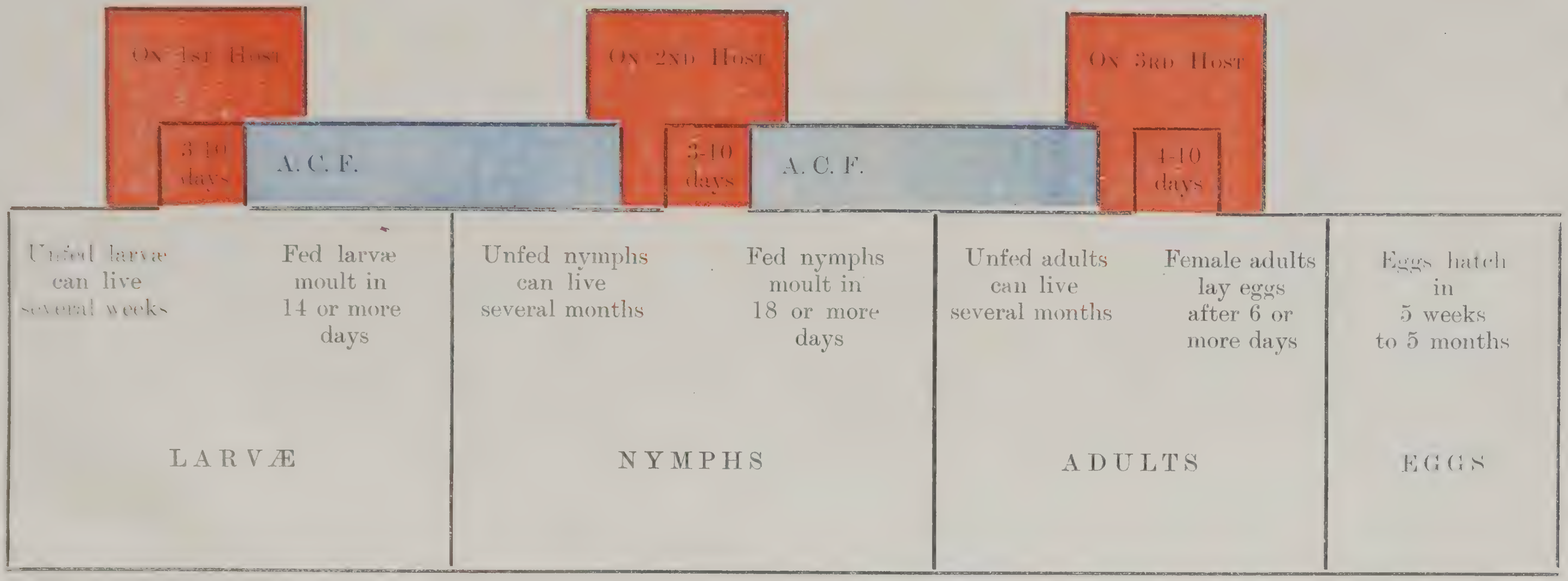
In the case of the brown tick, the adult female, having become engorged and fertilised, falls to the ground, where she finds a suitable place, such as the loose soil in kraals, and deposits some three to five thousand eggs. In from five weeks to five months—according to climatic conditions—the larvæ or "seed ticks" hatch out. These may remain unfed for several weeks until a suitable host is available, upon which they may remain attached for three to ten days. Having fed, they fall to the ground, and, moulting in about sixteen days, can remain alive unfed for several months, but will then attach and feed, remaining on the animal three to ten days. Having engorged, they fall to the ground, and in about eighteen days moult and are then ready to attach to a suitable host to feed as adults, although they may survive many months unfed. Having attached, they remain on the host from four to ten days, during which time they feed and copulate.



Eggs laid by a single tick (considerably enlarged). Photograph by Mr. R. J. Stordy, Principal Veterinary Officer, British East Africa.

Although larvæ and nymphs readily attach during the cold weather, the adults are scarce on cattle during the winter. Unfed adults have been known to live 630 days under laboratory conditions, and in practice it has been found that a race of infected brown ticks on a farm from which bovine animals have been removed may survive as long as fourteen months, possibly longer, and still prove infective. While the brown tick requires three hosts upon which to feed in its different stages, the red-legged tick requires only two, since the larvæ

THE BROWN TICK (*Rhipicephalus appendiculatus*).


ON 1ST HOST
3-10 days
A. C. F.
ON 2ND HOST
3-10 days
A. C. F.
ON 3RD HOST
4-10 days
Unfed larvæ can live several weeks
Fed larvæ moult in 14 or more days
Unfed nymphs can live several months
Fed nymphs moult in 18 or more days
Unfed adults can live several months
Female adults lay eggs after 6 or more days
Eggs hatch in 5 weeks to 5 months
LARVÆ
NYMPHS
ADULTS
EGGS

crawl into the ears of their hosts, where they feed and moult and feed again as nymphs, remaining on the animal about fifteen days.

It is fortunate that the parasite of African Coast Fever does not pass through the egg stage, as is the case with the parasite of redwater. However, if a larval brown tick has engorged on an infected bovine animal having the parasite of African Coast Fever in its blood, it can infect a susceptible ox to which it attaches as a nymph; or, again, if a nymphal brown tick has fed on an infected animal, it can infect a susceptible ox to which it attaches as an adult.

African Coast Fever is peculiar to bovines, and the causal parasite cannot establish itself in any other species; so that ticks can only obtain the parasite from an infected bovine animal, and then only from one in the last stages of the disease, when the parasites are present in its blood. If, therefore, an infected tick bites and completes its feed upon a horse, sheep or other non-susceptible animal, the parasite is discharged without affecting the animal, and the tick thereafter becomes non-infective. But it has been found that infected ticks are still infective after feeding upon a rabbit for three days, if they complete their feed upon a susceptible animal within seventeen days.

Infected ticks may, however, be *carried* by other animals to which they do not attach—by human beings in their clothing, in hay or crops, in the hides (especially the ears) of dead animals—and may thus be transported many miles. Precautions must always be taken against such risks, although in practice the great majority of outbreaks are brought about by ticks which have fallen directly from an infected ox which has at some previous date passed over or died in the vicinity.

The foregoing details may be more easily understood from the diagram. They are of considerable importance, because upon them are based the principles for the control of the disease.

How to Determine the Source of an Outbreak.—The disease having broken out, it is generally necessary to determine whether the animals became infected on the farm, or picked up infected ticks from without. In coming to any conclusion, it should be borne in mind that :—

(a) If the sick animal has been on the farm for a time covering the period of incubation, or roughly, a fortnight before shewing a rise in temperature, or one month before death, it is practically certain that it contracted the disease on the farm.

(b) If, however, the disease appears in animals which have not been on the property longer than a week, it is probable that it was contracted before they arrived; and in endeavouring to ascertain whether they became infected, it should be remembered that the disease may be in the system for about three weeks before visible symptoms are manifest, and that roughly one month elapses between the time of infection and the death of the animal.

(c) It frequently happens that the first case of a disease is overlooked, and that it is only diagnosed when quite a number of animals are affected at or about the same time—what is generally known as the " second crop " of cases.

The first animal to contract the disease supplies, during the last week of its life, to those brown ticks feeding upon it, blood containing the parasite. The larval or nymphal ticks dropping during that week seek shelter, moult, and when the opportunity arises, re-attach. As explained, this process takes at least sixteen days and generally longer, although the nymphs and adults may survive unfed several months awaiting the arrival of a suitable host. In addition to this, the disease is not noticeable in the infected animal until the last stages of the disease, often about twenty-one days; so that the " second crop " of cases does not generally occur until at least six weeks after the first case. It may happen that, if many ticks survive, quite a considerable number of animals become sick about the same time; but one tick is sufficient to carry on infection, and laboratory experiments shew that an adult tick can survive *unfed* as long as twenty-one months. Therefore, the alarming and original theories so frequently advanced to explain outbreaks, where previous movements of cattle cannot be fully traced, are generally unnecessary.

PRECAUTIONARY MEASURES.—1. *Short-interval Dipping.*—African Coast Fever is a disease which can be easily prevented by the simple expedient of *systematic dipping*. If introduced to a farm where short-interval dipping is practised, the disease cannot establish itself; and, when established on a farm, it can be quickly eliminated by the application of the process.

The term "systematic" or "short-interval" dipping implies the immersion of cattle and other domestic animals in solutions destructive to ticks and other parasites, at certain intervals based upon a knowledge of the life cycle and habits of these parasites.

In the case of African Coast Fever, the principal object to be attained is the destruction of the brown tick, and this presents certain difficulties because, as we have seen, this tick seeks different hosts in the larval, nymphal and adult stages, *and may escape from either in as short a time as three days.* Therefore, if it is to be caught, the dipping must be carried on at short intervals, and the dipping solution must be of such strength that the cattle can be immersed in it as frequently as every third day without being harmed by it. To obtain a dip thus harmless to cattle, and at the same time destructive to the tick, was a matter of considerable difficulty, but the problem was finally solved by Watkins-Pitchford, who, after numerous experiments, evolved the so-called "laboratory dip," which was made up of :—

5½ lbs. soft soap,
2 gallons paraffin,
8½ lbs. arsenite of soda (80 per cent. arsenic),
400 gallons water.

But when it was found that certain ticks could attach and escape within as short a period as seventy-two hours, the composition was modified to form what was known as the "three-day dip," viz. :—

3 lbs. soft soap,
1 gallon paraffin,
4 lbs. arsenite of soda (80 per cent. arsenic),
400 gallons water.

Since Watkins-Pitchford's discovery, several proprietary dips of a similar composition, and based upon the same principles, have been put on the market, and the one chiefly used in this country is that prepared by Messrs. Wm. Cooper and Nephews, known as "Cooper's Improved Dip," which, by arrangement with the Government, is sold at a specially low price.

In addition to the actual in-contact effect upon the ticks, it is found that these solutions protect the animal for a short period by their repellent effect, and also by reason of the fact that a certain quantity of arsenic is absorbed through the skin and permeates its lower layers and becomes stored there: so that it is probable that the tick also becomes poisoned by the ingestion of arsenic.

Although, for the eradication of an established outbreak of African Coast Fever, three-day dipping is absolutely essential, and should be practised on farms menaced by the disease, in other circumstances it has been generally found more convenient to dip once a week, a certain day being recognised as "dipping day," the natives and cattle becoming used to it as a regular part of the farm routine. Where the ticks are controlled in this way, African Coast Fever can only gain a footing by the merest chance and is promptly eliminated.

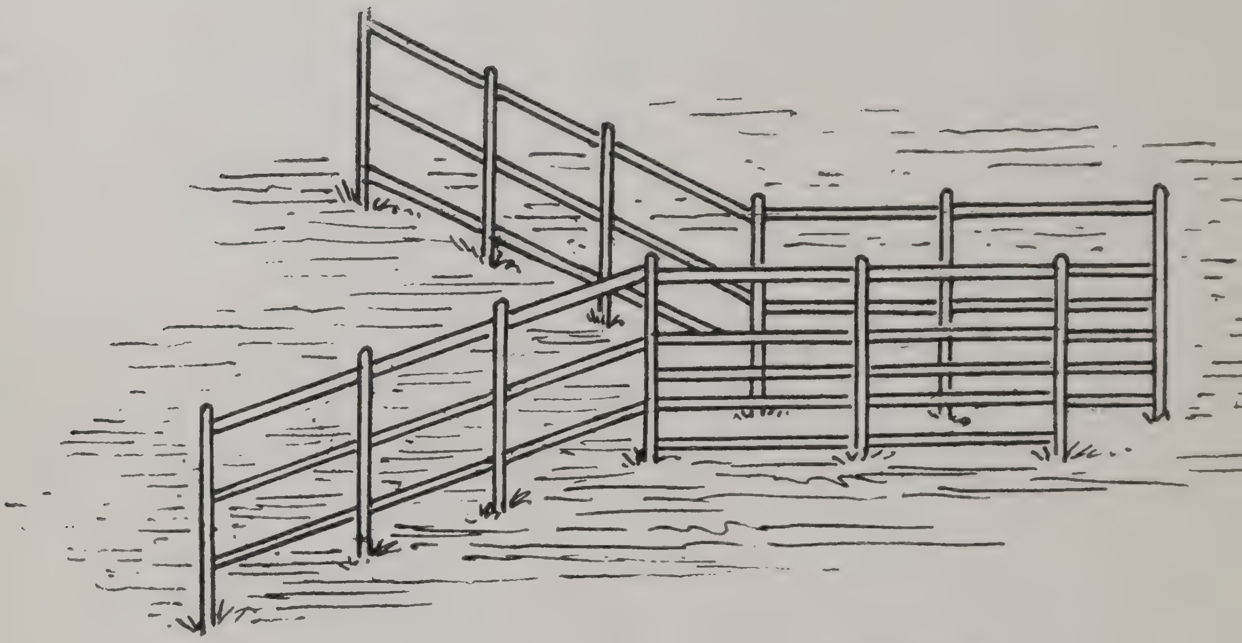
Dipping fluids should be frequently tested. In hot weather they are liable to become too strong, as the result of evaporation; in the wet weather too weak, as the result of flooding. A solution under strength is a serious danger, by giving rise to a sense of false security.

It is a habit of the brown tick and the red-legged tick to make their way into the ears and attach themselves to the eyelids, where they may remain protected from the dip, as animals which are accustomed to being dipped learn to avoid the complete immersion of the head. Ticks under the root of the tail often escape owing to some animals keeping the tail compressed when being dipped; others in the tuft of the tail are also protected by the matting of the hair. Therefore, if the best results are desired in combating African Coast Fever, these parts should receive special dressing in addition to the dipping, for it is most important that no infected tick shall escape. For this purpose a mixture made by dissolving six to eight paraffin wax candles in one quart of paraffin oil has been recommended.

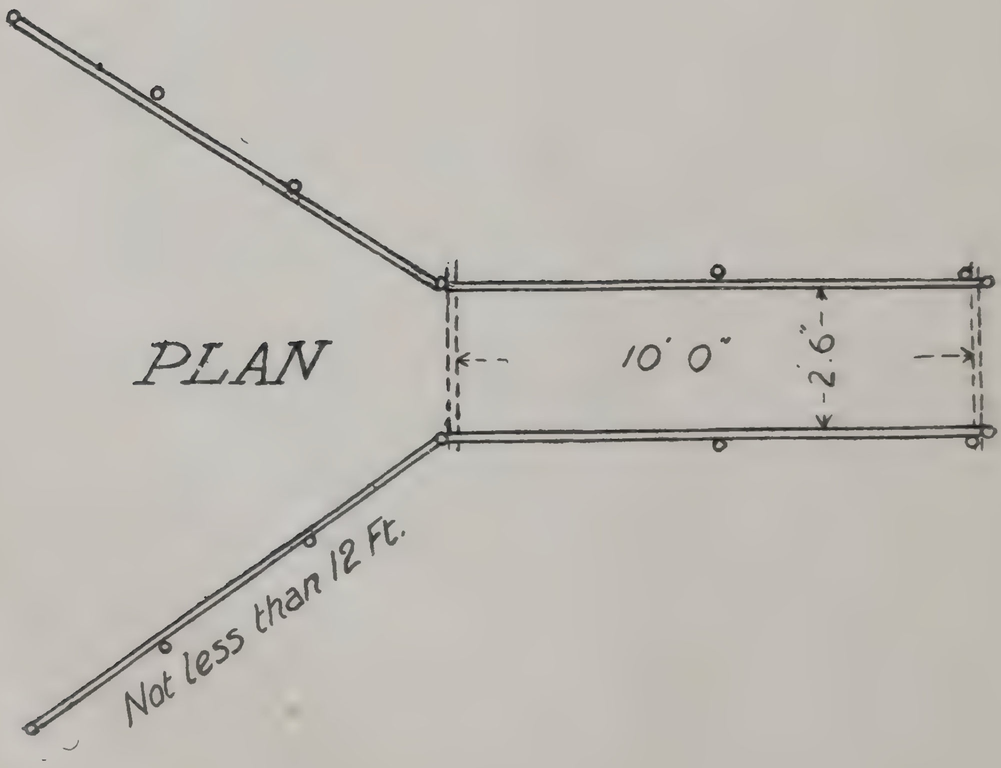
Both the blue and brown tick will attach themselves to equines, sheep, goats and other animals, but in so doing to a great extent lose their infectivity to cattle. Nevertheless, a farm on which ticks are few is better ensured against disease than where they are plentiful, and any system of dipping should, as far as possible, include all classes of stock on the farm. Again, it must be borne in mind that in various stages the ticks can remain for long periods on the ground without feeding, and any system of dipping must be carried out regularly and for a considerable period, to ensure that the crops of ticks are caught as they attach. A dipping campaign must, therefore, extend over a lengthy period.

By systematic dipping, *cattle and other animals act as tick traps*, collecting the ticks and conveying them to the dip to be destroyed; and, if the process is conscientiously carried out, the desired results are often achieved even more quickly than might be expected. In one of Watkins-Pitchford's experiments it was found that a badly infected area was cleansed of brown ticks in as short a period as three months. Apart from the protection afforded against African Coast Fever, the benefits to be derived from systematic dipping in eradicating redwater and allied diseases, and thus bringing about a general improvement in his stock, compensate the farmer for the trouble involved. The importance of regular dipping is no longer based upon theory, but has been abundantly proved by practical experience, in the light of which the stock-owner who fails to dip his animals must be regarded not only as a fool to his own interests, but a menace to his neighbours and an obstacle to the progress of the country.

2. *Temperature Camp System.*—In the days before *short-interval dipping* was introduced, African Coast Fever was often successfully dealt with on the *temperature-camp system*. This was based upon the knowledge that the infected animal shewed an elevated temperature for several days before the parasites made their way into the blood and the ox became a source of danger. That is to say, advantage was taken of the period of warning which in the chart is indicated by the blue colouring and is called the "second stage." For the success of the system it was necessary that there should be certain clean veld to which cattle could be shifted. This was divided into a small clean temporary camp (Camp No. 1) and a larger clean permanent camp (Camp No. 2).



Cattle crush and pen for taking temperatures.



A crush-pen having been erected, the temperatures of all in-contact animals were taken daily. Those shewing an abnormally high temperature were marked, and if this continued for a second day, were isolated or destroyed. With oxen and animals of average size and breeding, an early morning temperature of 103 degs. F. was regarded as suspicious. With calves and highly bred or nervous animals, a temperature a little above the average was to be expected, and a certain amount of discretion had to be exercised in interpreting the readings. It was rather upon a sequence of high temperatures than a single elevation that animals were condemned, and, when possible, the temperature reading was controlled by microscopic examination of gland smears in which, in infected animals, "Koch's bodies" could be detected before the animals became a source of infection. Infected animals having been detected and disposed of, all in-contact animals were carefully sprayed and were moved on to Camp No. 1, and were there temperatured daily for at least three weeks. If during that time any suspicious rise of temperature persisted for two or more days, they were destroyed or sent back to infected veld. Those animals which registered a normal temperature throughout the three weeks were again carefully sprayed and passed on the second camp, where they remained unless a further case occurred, which indicated that Camp No. 2 was not clean veld; in which case the process had to be gone through again, and the cattle were once more moved on through temperature camps to new grazing thought to be clean.

The foregoing method is even now resorted to in dealing with an outbreak where dipping tanks are not available, and is generally combined with short-interval dipping when dealing with serious outbreaks, the extent of which is not understood. The closer settlement of the land, however, has generally limited the areas to which in-contact cattle can be removed. With this system, infected pastures had to remain free from cattle for a minimum period of fifteen months to allow the infected race of ticks to die out, whereas with the short-interval dipping, by the collection and destruction of ticks, the veld becomes cleaned in a far shorter time. The latter system, therefore, is quicker and far more satisfactory and has generally replaced the temperature-camp system.

GENERAL PRECAUTIONS.—When it is remembered that fully 95 per cent. of animals affected with African Coast Fever do not recover, and that up to the present no successful method of treatment has been discovered, and when the losses and inconvenience to the community are considered, it should not be necessary to urge every stock-owner to take the fullest precautions against this disease. As previously pointed out, it is of the greatest importance to detect the first case, and thus prevent the " second crop " of cases which will follow from it if preventive measures are not promptly adopted. Therefore, even in districts thought to be free from the disease, the cattle-owner should always be on his guard and should observe every sick animal and notify to the Veterinary Department any case of an unusual character coming to his notice. Such precautions are, of course, all the more necessary in districts where the disease is known to exist.

In reporting cases to the Veterinary Department, the following particulars should be given :—

1. Age, sex, colour and breed of animal.

2. Where sick. How long in present locality. Place from whence animal came.

3. How long sick, and when death occurred.

4. Symptoms: Temperature; breathing; state of coat; appetite; urine and fæces; any unusual conditions.

5. *Post-mortem* condition of blood; glands of throat; wind-pipe; lungs; heart; liver; stomach; kidneys; bladder; any unusual conditions.

In describing size and colour, compare with some well-known object.

6. Temperature of animal at time when smears were taken, and part of dead animal from which smears were taken.

7. Number of animals on the farm. How many sick or dead to date.

8. Treatment and preventive measures adopted.

Smears should be taken in the manner previously described, and should be submitted with the report.

* * *

A dipping tank in use. In the systematic dipping of stock lies the solution of the African Coast Fever problem.

* * *

Stray cattle, travelling oxen and all cattle newly arrived on a farm are the principal sources of danger, and should not be allowed to mix with other cattle on the farm until twenty-one days after arrival. They should be dipped or sprayed on arrival, and again before being allowed to mix with the herd. Cattle should not be allowed to graze over the whole of a farm, but certain areas should be kept free from cattle, one portion being large enough to carry the whole herd indefinitely, should necessity arise. In order that this reserve area be not too great a handicap on the grazing capacity of the farm, it should be supplemented with a haystack. A crush-pen should be erected on all farms in order that cattle may be more easily handled and temperatured, sprayed or treated as expeditiously as possible.

Stock-owners should provide themselves with clinical thermometers, glasses for preparation of blood smears, bottles for the forwarding of spleen, spray pumps, and a quantity of dipping material. Every farm should be provided with one or more dipping tanks. The benefits to be derived from short-interval dipping cannot be too strongly insisted upon. The stock-owner who regularly and systematically dips his stock has little or nothing to fear from African Coast Fever, and if the principle were adopted throughout this Territory, this and many other equally serious diseases of cattle would soon cease to exist.

Proposed Canning Factory.

By O. C. Rawson.

The year 1915 has seen a great difference come over the cattle industry of Rhodesia, not unforeseen by some, but owing to the changes resultant on the war, earlier than most people expected.

With a view to finding a steady and yet equitable market, a small body of farmers for some weeks past have been enquiring into the possibility of starting meat works in Rhodesia in the form of a canning factory, and it is to gain support and ventilate some of the ideas which underlie the scheme that these few notes are compiled.

The influx of new settlers, and the increasing development of the country, both on mines and farms, have in years past provided both a lucrative and steady market for those engaged in stock-raising, but owing to the war, most of this has been swept away, while cattle are increasing in numbers and are lower in price to-day than ever before, or within the memory of most of us.

In addition to the easing off of the demand, most farmers find that year by year they have oxen and cows in increasing numbers which are of no further use either as workers or for breeding purposes. Under present conditions, as they are unsaleable, the majority have to be kept on until death relieves them of their sufferings in winter. Of course I do not wish it supposed or maintained that the proposed works are simply for the purpose of turning useless and old stock to a profit, but it is a fact that all over the world stock which is considered too poor for freezing or chilling is converted into extract of beef or tinned meat.

Cattle to-day in Rhodesia stand in the same position as the maize industry did at the time when farmers formed the Co-operative Society; in other words, we want a market, and can only get it by organisation and combination. Other countries are doing this, and if South Africa lags behind, we shall wake up to find that Brazil, Siberia, Senegal and Madagascar have secured the trade which should be ours.

In considering the position, it has often been stated that we must freeze and export beef, but in the opinion of those connected with the industry, such a scheme is not feasible at present, for the following reasons:—We have not sufficient stock in the country available, as no steamship fitted out for the beef-carrying trade would come to Beira unless we could consign several thousands of quarters at a time. It is well known that at present, owing to the war, inferior meat is selling in England, but the time was and will be again when only the best is wanted, and of a uniform grade. Let anyone who is not convinced go into a butcher's shop in Rhodesia and see the variety of carcases hanging there, and he will get his answer.

To start a freezing and chilling scheme, a very much larger amount of capital would be required, as a much more expensive and extensive plant would have to be erected. But over and above all these considerations, we are faced with the fact that Rhodesia imported 656,423 lbs. of canned meat in 1913, valued at £22,076, and 363,795 lbs., valued at £14,168, in 1914; while the Union imported 3,867,322 lbs., valued at £143,050, in 1913, and 2,852,492 lbs., valued at £118,495, in 1914. This, on a basis of 450 lbs. dressed weight per animal, works out at 18,087 head of cattle brought in from overseas in two years. So long as meat is coming to Africa in these quantities, it would be the height of folly for us to try and supply London at a figure which would give a lower return to all concerned; but I may add that this point has been thoroughly gone into, and it is considered the oversea trade will offer a good market when the time comes for export. And canning has always been the forerunner of the freezing business; at least in other countries of the world.

On the other hand, as a use and a market can be found for everything, there would be no waste in a canning factory.

Stock, on arriving at the factory, would be classed into grades according to what use they could be put to, or what proportion of the various products could be got out of them. The grades would have different prices, so that a farmer who sent a good young steer, suitable for the local beef trade, would get a higher price than one sending in an old cow, which would yield a large amount of tankage and a small quantity of tinned beef and beef extract. The skins, horns, hoofs, entrails, blood, in fact everything, has its use, and is put to some purpose.

Another point not to be lost sight of is, that under present conditions most farms are rapidly reaching their carrying capacity, whereas if a sure and steady market is open, it will at once increase the grazing possibilities by 25 per cent., through a farmer being able to off-load his stock at the proper time.

The ability of Rhodesia to support such a factory can be taken as an established fact. Our total stock, according to the last census figures, was 748,058 head, being an increase of 284,135 head in four years, equal to 61 per cent., or about 15 per cent. per annum. On the present figures, this would mean an annual addition of 112,200.

In considering these figures, it is not necessary to take into our calculations transport oxen, as with a market for them, they would ultimately find their way to the canning factory. The same applies to cows.

The consumption of Rhodesia is put down at 50,000 head per annum, but it is undoubtedly a good deal below this figure, which would leave an annual surplus of 50,000 to be dealt with, apart from the fact that the packing company would kill and handle a large proportion of the first 50,000 in local trade to butchers within reasonable rail distance. As it is proposed to start with a plant equal to a canning maximum of 9,000 head per annum, it will be seen there is ample margin, but if necessary, capacity could be largely increased at a nominal cost. No consideration is taken of Northern Rhodesia, Portuguese territory or Bechuanaland, but there is no reason why these countries should not become supporters of the factory.

New Zealand and Australia are in the forefront of the beef and mutton industry, and it may not be out of place to consider their position. The former, with 2,000,000 head of cattle, has 33 works in operation, and is adding largely to the number; while the latter, with 11,400,000 head, has 35 works in operation. Of course these works deal with sheep as well as cattle, but when we see that 1,500,000 quarters of beef are shipped annually to the United Kingdom, equal to 375,000 head of cattle, or slightly over 2½ per cent., and this is without taking into consideration the large amount shipped to the Mediterranean and the Far East, and the millions of tins of corned meat turned out, one is struck with the possibilities here.

Brazil and Madagascar are among the latest countries to start works for supplying the world-wide demand for beef.

I have purposely not touched upon the financial details, as they are not yet in a complete enough stage for publication, but the broad outlines, in view of the numerous enquiries received, may not be out of place.

It is recognised on all sides that this should be essentially a farmers' concern, and although the true co-operative form was considered, it is not recommended where we are dealing in a manufactured article, entailing a certain element of risk and a large capital outlay. The nominal capital is put down at £100,000, of which £50,000 would be called up on flotation, the balance remaining in reserve for future members and contingencies. Of the £50,000, practically half would be required for the erection of the factory and machinery, the rest being working capital. As I said previously, it is considered that to make the concern a success, it is desirable that most, if not all, farmers should participate, and with this idea in view, and to make the realisation easier, at the option of the applicant the share call will be payable in half cash and half stock, with a minimum subscription of fifty shares. This, it is expected, will enable many to come in who would otherwise be debarred; but it must be recognised that farmers must be willing to make some sacrifice to attain the end in view, and a business like this, which will be of incalculable benefit to Rhodesia generally, cannot be started without a considerable cash outlay.

If, on the other hand, farmers cannot raise the necessary funds, and outside capital has to be employed, it will mean that we place our stock, as regards value, in the hands of a financial corporation over which we have no control.

The promoters of the scheme wish to make it clear that their object is not to raise the price of beef to a prohibitive figure, put to find a fair and staple market for cattle, and to stop the present deplorable loss to stock-owners which occurs every year.

After making all provision for the proper running of the business, the dividends of the factory are to be limited to 10 per cent. on the issued capital, and any further profits will be divided *pro rata* amongst those shareholders who have supplied cattle during the previous twelve months, but the price payable for stock at the factory door will be regulated as near as possible on the cost of manufacturing and the value of the various products.

Rhodesian prices can be taken as moving from 40s. per 100 lbs. in the spring to 30s. per 100 lbs. in the summer. That could be considered a fair value if one could effect sales, but such is not the case, as sellers are many, while buyers are few. The following prices of beef cattle in Argentine shew the rise in the world's markets :—1906, from £7 to £8 per head; 1910, £9 to £11; 1914, £14 to £15 per head. I think we could compare these with Rhodesian prices if we reversed the process.

Again in the world's markets to-day, chilled and frozen beef wholesale quotations are as follows :—

London, 5¼d. to 7⅜d. per lb.
Brisbane, 4¾d. per lb.
Adelaide, 4⅞d. per lb.
Canned beef--London, 46s. to 48s. per case.
Beef extract, 4s. to 5s. per lb.

In conclusion, let me add that it is to be earnestly hoped that all sections of farmers, and all parts of the country, will help to contribute towards making this a success. The time is ripe, the cattle are here, and if this opportunity is lost, we may never get it again, as it is well known that other parties are only waiting favourable opportunities to handle the cattle industry of Rhodesia. Even South-West Africa, with its 200,000 head of stock, has its canning factory, and before the war regularly supplied tinned beef to the ships calling at the ports, and the troops and people in the country. Are we to go on paying out ever-increasing sums of money for meat, while our own industry lags for want of a market? It is to be hoped a favourable answer will be received to the call which is to be made at an early date.

THE WORLD'S BEEF TRADE.

Country.	Cattle.	No. of Factories.	Quarters Exported.
New Zealand	2,000,000	33	371,604
New South Wales	2,231,973		
Queensland	5,322,033		
Victoria	1,528,553		
South Australia	352,905		
West Australia	829,489		
Tasmania	205,743		
Northern Territory	417,643		
Total	10,888,339	35	1,464,965
Argentine	29,500,000	14	4,375,019
Brazil	21,000,000	works just	opened
Madagascar	600,000	works to	be erected
Union of S. Africa	approximately 5,000,000	nil	nil
Rhodesia	748,058	nil	nil

Additional works are being erected in the Northern Territory, Australia.

Cattle Breeding in Southern Rhodesia.

By R. C. Simmons, Chief of the Animal Industries Branch.

During the last few years various opinions have been expressed as to the wisdom or otherwise of grading up our native cattle. At the present time, however, the great majority of our cattle owners are agreed that we must grade our cattle up to something more nearly approaching the European type if we wish to sell the surplus beef, which we hope some day to produce, or to secure a place in the world's dairy markets.

The old conservative line of thought which saw little good in an animal that could not care for itself has been overcome. It is realised that the production of meat for human consumption is a business which is as susceptible of business management as the production of machinery, or any other article. It is acknowledged that in order to attain success one must proceed on definite lines, and discard haphazard methods which lead practically to nowhere.

So far so good. The foregoing represents very much greater progress than may be apparent to the casual observer. It means that stock farming in this country has been rescued from the slough of stagnation; has been brought into line with farming in older countries, and a footing secured for it on the first rung of the ladder which leads to the goal we are striving for—that of a successfully established industry.

There are now before every stock-owner in this country two very important questions. The first—more easily solved than the second—is, on what definite lines shall we proceed—beef or milk? And the second—which time and experience alone will solve definitely—is, what methods of improvement shall we adopt towards the end in view?

Now, while both these questions present very great difficulties, there are, nevertheless, certain accepted and proved axioms in regard to the stock industry which enable one to approach the subject systematically, and to reduce the field of argument, as it were, to certain limits, and to avoid that confusion of thought which so often arises when one is striving to act for the best.

Mr. Alex. Holm, in the course of his very interesting lecture delivered on the show grounds at Bulawayo in May last, emphasised two points which the writer has consistently endeavoured to impress on the minds of farmers and others with whom he has come in contact during the last few years, namely, that one thing at a time should be aimed at, and that both beef and milking qualities in the same individual animal should not be worked for, because the one quality or the other must be inferior. Having decided on a breed to use in grading up the herd, use that breed and that only for two or three generations at least, until it has stamped itself on the herd. If the breed chosen is then unsatisfactory in any particular, a breed to correct the fault may be sought for. Indiscriminate changing from one breed to another only produces mongrels in the end; some of the said mongrels may be of great excellence, but one never knows what they will produce. An exception to this rule may perhaps be made when a bull is used for a first cross on small native cows, in which case it is sometimes wise to use any good big hardy cross-bred bull once, and thereafter to use the breed it is intended to go on with.

Let us consider for a moment the essential points that must guide us in deciding the first of the two questions referred to, *i.e.*, whether our energies shall be directed towards milk production or beef.

Now, dairying implies the farming of a comparatively small area intensively. Except possibly in the event of cheese-making being taken up, the produce must be got to market or to the railway siding fairly frequently, say at least once a week in winter, and twice a week in summer. Then, dairying cannot be successfully undertaken on business lines unless there is sufficient good arable ground to grow winter food for the stock, a reasonably reliable rainfall, and unless also it is possible to get produce to rail head or market in reasonable time and at a reasonable cost. It is somewhat difficult to define reasonable time and cost in this connection, but in the case of cream and butter production one may state that it is necessary to be within 20 miles of the rail, or to have facilities such as co-operative transport and the like, so that the time and expense occupied in transporting produce over the greater distance are not greater than transporting them 20 miles on one's own account. In the case of a milk trade, distance by road and train service must be considered, and a daily service must be maintained. Cheese-making is not limited to any appreciable extent by distance from market, and may be carried on anywhere. The consideration in the case in point is the distance at which the cows are situated from the manufacturing point.

Ranching, on the other hand, requires a large area—at least 17 acres per beast. It is little affected by distance from rail, provided no outbreaks of disease, or the like, prevent the product, *i.e.*, live cattle, being walked to market. It calls for little arable land—all that is required is good grazing, water and natural shelter.

We can then tabulate our thoughts on this question as follows :—

	Butter and cream production.	Sale of fresh milk.	Cheese making.	Ranching.
Distance from rail or market	20 miles or its equivalent	Must reach market daily within 12 hrs. in winter and 6 in summer	Distance from rail no object	Distance from rail or market no object
Class of land	6 % arable land, good grazing and shelter	do.	do., if carried on all the year round	1% arable land, good grazing, water and shelter
Area required	From 250 to 1,500 morgen	do.	On a commercial scale, 5,000 morgen	From 10,000 morgen upwards
Capital required	Small	Small	Medium	Large

Now we come to the larger question of what class of cattle to keep.

Let us suppose that we have decided on butter and cream production, and we have found suitable land. We have seen that dairying means intensive farming. That is to say, we are prepared to utilise the farm to its fullest extent, and to grow foods for the cattle, to provide shelter for them, and so on. Very well; within certain wide limits we need not be so afraid as the rancher may be of getting the cattle too fine. We do not want them to live entirely on the veld, and in any case, following Mr. Holm's advice, we are not going to breed stud stock (except perhaps a few head, about which more later), so we need not have a cow too pure bred, provided she is a good milker. The first thing, then, to keep in one's mind when purchasing the herd of cows, is to get the best butter fat producing cows that can be afforded irrespective of breed.

This has simplified the problem immensely. We have cut out considerations of beef production, size, hardihood, and the thousand and one other considerations that usually hamper one in arriving at a decision, and have merely to get the best butter fat producing cow we can afford. It is assumed, of course, that the capital available is limited, and as dairying is essentially for the small man, the possibility of importing a number of expensive pure-bred cows has been disregarded. Now, the native cow, as is well known, gives a milk very rich in butter fat, but for other reasons she is not usually a profitable cow to feed for dairy purposes, because, although her fat percentage is high, her milk yield is low, and the net yield of fat is low. Careful enquiry into the matter will shew that a good grade cow, say one with native, Africander and Shorthorn or Devon blood or Friesland blood in it, such as may be bought at a reasonable price in this country, will often give a good yield of milk and at the same time a high percentage of fat. Is not this then the kind of cow to seek for our particular purpose, especially as it so happens that she may be expected to stand local conditions well into the bargain?

Having got our herd of cows together, what are the factors that must guide us in the choice of a bull? Butter fat production —nothing more. This then eliminates Africanders, Aberdeen

Angus, Sussex, Herefords, beef-bred Shorthorns and the like, because we know that these are not the best dairy cattle, although many of them may be very useful at the pail. In most cases we shall probably cut out Ayrshires (they are notably more suited to milk and cheese production than to cream production), and most Frieslands give a moderate fat percentage. We have reduced our choice practically to dairy Shorthorns or Devon or Jersey, and we have not definitely cut out the Ayrshire. The Jersey is notably not so good crossed as pure, and is not largely used on a strictly commercial scale, chiefly because the old cows and steers are particularly unsaleable. If our veld is exposed the hardy Devon will undoubtedly suit us best, but on average veld the choice is largely one of individual taste and inclination.

The next question is, are we to use a pure-bred bull, and if so, are we to continue with the pure-bred bull? The answer to this is : Always use a pure-bred bull if it can be afforded, and if one can be obtained with constitution, stamina, out of a good cow and from a known good herd. Otherwise use the best grade bull of your chosen breed that can be got, and preferably one that is a straight grade, that is to say, if the choice is Shorthorn, the bull should be Shorthorn-native or Shorthorn-Africander, and be free from crosses of Friesland or the various other breeds.

Now, we have said that the question of hardihood has been eliminated in the case of dairy stock. It is, however, conceivable that it may be found that one has under-estimated the quality or carrying capacity of one's farm, and that by the use of a pure-bred bull a point has been reached when the cattle have become unthrifty. In the writer's experience this fault may be overcome by the use of a good grade bull, as described above. *Vice versa*, if the grade bull has not given satisfactory results from the point of view of yield, he should be followed with the best obtainable pure-bred. It is of the greatest importance that the breed should not be changed to a greater extent than this until the characteristics of the original pure breed chosen have been well stamped on the herd, say, in two or three generations. Then, if it is thought that a change would be beneficial, there is no reason why it should not be adopted ;

for instance, Ayrshire blood might thus be superimposed on Shorthorn to increase the milking qualities, or Shorthorn blood might be superimposed on Devon to give more size and quantity of milk. It is most essential to avoid breeding mongrels, for even if a large percentage of these are good, the young bulls will not be saleable, because of the uncertainty as to the character of their progeny.

We will now take the case of the rancher. This is a business which does not give quick returns, and which needs a considerable capital outlay in order to give a living income. Provided that they are obtainable, it appears to be a more or less accepted fact that the foundation females for the beef industry should be the best native cows obtainable, or perhaps Africander cows. Good local grade cows of a kind which are obtainable in small numbers would, in the writer's opinion, be distinctly more profitable, but the trouble in this case would be to get enough of them.

Ranching, unlike dairying, presupposes extensive farming, and no agricultural operations are contemplated beyond the provision of a little winter feed for the bulls, possibly mealies for home consumption, and the production of rough veld hay. The question of hardihood and ability to withstand local conditions is then an all-important one, and must on no account be overlooked. At the same time it would appear that the average owner will be most unwise if he does not aim all the time at a type of beast approaching the European standard. How then must he go about it to choose bulls? He wants beef, nothing else; if his cows will keep their calves, he does not require them to give a drop of milk over, or rather he should not if he follows Mr. Holm's advice. This removes from consideration all the known dairy breeds, such as Jersey, Friesland, South Devon, dairy type North Devon, milking Shorthorn of any kind, and so on, and the choice lies between Africander, beef Shorthorn, Hereford, Sussex, Polled Angus, and so on, or grade bulls of those breeds. Now, in the writer's opinion, pedigree in a dairy bull, or ancestry in the case of a non-registered bull, is a vastly more important factor than the same thing in a beef bull, except that in the latter case a bull out of a heavy milking cow or from a known heavy milking herd should be avoided. On the other hand, the individual qualities of the beef sire are of the first importance. The reason for this opinion is that although sometimes very ugly, unshapely dairy bulls get most excellent dairy progeny, it is seldom that a beef bull that is not individually good to look at gets good beef progeny. The sire then, whatever he be—pure or grade—should be undoubtedly of a beef type, and full of vigour, constitution and masculinity. Cut out every animal that does not answer to this description.

Is the beef bull to be pure or grade? Experience would seem to shew that for native cows of small size any big, hardy, strong bull, capable of transmitting constitution and size, is a profitable bull to use. Once, however, a little size has been obtained in the cows, then a breed must be chosen, and either pure or grade bulls of that breed must be used, as recommended in the case of the dairyman. Mr. J. M. Sinclair tells us that on some of the more prominent ranches in Texas only pure-bred bulls are used, but they are further advanced than we, and have bred their own bulls to a point when they may be considered pure. On a ranch, in the proper sense of the term, there would appear to be but one course to pursue, namely, to buy pure-bred bulls and put them to selected cows, with a view to using their male progeny on the general herd. Of course, if one is fortunate enough to possess a suitable pure-bred bull that will withstand ranch conditions for even a few months in the year, he should be used on the general herd by all means. Mr. Holm's advice about not changing the breed too frequently applies equally to a ranching as well as to a dairy stock, even if in the second or third generation faults begin to appear. Provided the advice is adhered to, however, pure-bred cattle are not required, but merely beef cattle of one type. Now, the alternate use of bulls of, say, two different breeds does not necessarily militate against uniformity of type, but this desirable result can only be obtained by the strictest culling of all animals which do not conform to the desired type.

Hitherto we have considered grade or cross-bred animals only. The breeding of pure-bred animals admits of little discussion as to methods of procedure. A pure-bred stud implies intensive farming, feeding, bedding, housing and constant attention to detail. Success can only be attained by those who have the discriminating eye for the type they want, and who will rigidly discard every animal not of that type. To breed pure-bred animals with a view to farming them on the same lines as local or grade animals is, in the opinion of the writer, the most hopeless waste of time and money imaginable. There is no reason why either the dairyman or the rancher should not keep a few pure-bred cows or heifers to put to his pure-bred bull, provided he runs them as a separate department, and gives them the necessary attention. They must be kept separate, if they are to attain the maximum of success.

Freight on Fruit.

It will be of interest to fruit growers to know that the Beira and Mashonaland and Rhodesia Railways have agreed to grant a temporary rate of £4 per ton o.r. (minimum 50 lbs.) for fruit grown in Rhodesia when consigned from any station Umtali to Salisbury (both inclusive), and from stations on the Mazoe and Lomagundi Branches to Mafeking when consigned to stations beyond.

The rate from Mafeking to Johannesburg is 15s. per ton plus cartage, 2s. 6d.

Growers can therefore send fruit to Johannesburg for £4 17s. 6d. per ton, which for a case of citrus (26 by 12½ by 12½) containing an average of 150 oranges is about 4s. per case.

We are advised that oranges and lemons should make remunerative prices in August and September in Johannesburg.

The rates to England on citrus fruit in the standard case, 26 by 12½ by 12½, is 30s. per ton by rail and 25s. per ton by sea, or about 2s. 6d. per case from any station in Rhodesia to the English port.

The General Manager of Railways has also been asked to revise the internal rates on citrus and other fruits; also the rates on imported box wood.

Manuring of Maize on Government Experiment Farm, Gwebi.

By A. G. Holborow, F.I.C.,
Assistant Government Agricultural Chemist.

Resulting from an experiment on the manuring of maize covering the seasons 1911-12, 1912-13 and 1913-14, the Government Agricultural Chemist recommended a dressing which by judicious application had been proved to be a profitable investment. A detailed report upon these manurial trials appeared in the *Agricultural Journals* of August, 1912 and 1913, and a complete report embodying the beneficial effects of the residual fertilisers from the 1911 dressings in the August, 1914, *Journal.* The reader is referred to these articles.

To epitomise the essential factors of those field trials, it is necessary to re-state here that the elements of plant food, nitrogen, phosphoric oxide and potash, were supplied by the following substances :—

Nitrate of soda, containing 15 per cent. nitrogen ;
Double superphosphate, containing 42 per cent. phosphoric oxide soluble in water ;
Sulphate of potash, containing 50 per cent. potash ;

and that these were applied in various combinations, with the result that a comparison between the value of the increased yield of maize due to manuring and the cost of the manurial dressing was made. The combination that originally lent itself for recommendation was a complete dressing of the following composition :—

per acre {
50 lbs. nitrate of soda,
75 lbs. double superphosphate,
40 lbs. sulphate of potash,

costing at the time 28s. 6d. at Salisbury.

Many maize growers, however, considered this outlay rather high, and to lessen the expense involved it was thought advisable to subsequently reduce it to—

per acre {
35 lbs. nitrate of soda,
65 lbs. double superphosphate,
25 lbs sulphate of potash,

costing at the time 20s. at Salisbury.

The main objects in view when laying out the 1914-15 field trials were :—(1) To obtain justification for reducing the initial expenditure per acre, by placing side by side, for comparison, plots manured with—

(a) " Initial " formula, costing 28s. 6d. per acre;
(b) " Revised " formula, costing 20s. per acre;
(c) " Double " revised formula, costing 40s. per acre;

(2) to corroborate the experiments of 1911-12, which proved that " large and profitable increases in the yield of maize are obtained on red land from the use of a complete fertiliser dressing."

The red loam selected for the experiment had not previously received any manurial treatment, and had been under maize cultivation for the previous two years. The trials were carried out in co-operation with the Division of Agriculture and Botany, on half-acre plots in duplicate, and the average taken of the two plots. The ground was ploughed, rolled and disc-harrowed, and finally twice spike-harrowed. Selected seed maize (Salisbury White variety) was planted on 8th December, and the fertiliser applied by hand along the rows after planting. The land received three cultivations during the first three months of the growing season. Reaping took place during the fourth week in May. The rainfall during the season 1914-15 at the Government Experiment Farm was as follows :—

1914.—September	... ...	0.36 inches.
October	... ...	— inches.
November	... ...	2.14 inches.
December	... ...	11.39 inches.
1915.—January	... ...	7.09 inches.
February	... ...	7.58 inches.
March	... ...	2.55 inches.
April	... ...	0.62 inches.
May	... ...	0.08 inches.
Total	... ...	31.81 inches.

TABLE I.

Effect of Fertiliser upon the yield of Maize per acre on Red Land on the Government Experiment Farm, Gwebi, 1914-15.

Manurial dressing per acre.	Yield of grain per acre (average of two plots). Lbs.	Increase due to manuring. Lbs.	Value of increase at 8s. per bag of 200 lbs. on farm.		Cost of manurial dressing.*	
			s.	d.	s.	d.
Plot (1)— 35 lbs. nitrate of soda 65 lbs. double superphosphate 25 lbs. sulphate of potash	3,293	1,232	49	3	20	0
Plot (2)— 50 lbs. nitrate of soda 75 lbs. double superphosphate 40 lbs. sulphate of potash	3,108	1,047	41	10	28	6
Plot (3)— 70 lbs. nitrate of soda 130 lbs. double superphosphate 50 lbs. sulphate of potash	3,320	1,259	50	0	40	0
Plot (4)— No manure ...	2,061 †	...	...		...	

* The cost of the manurial dressing was calculated on pre-war prices.
† Average of three check plots.

Table II.

Percentage of Cobs 6 inches in length and over.

Plot (1)	78
Plot (2)	75
Plot (3)	78
Plot (4)	60

Reviewing the figures obtained from the present fertiliser trials, it will be seen that for an outlay of 20s. per acre expended upon a complete fertiliser dressing, very profitable increased returns are obtained.

The tests this season bear out even in a more marked degree and fully corroborate the conclusions arrived at as the result of the 1911-12 experiments, namely, that the application of fertiliser is a profitable investment.

It is not intended to arrogantly assume that the productive effect is the same for all Rhodesian soils. Our experience is confined to the red loam at Gwebi, and before deciding whether it is expedient to venture an outlay in fertilising a large acreage, it behoves the farmer to first assure himself that his lands respond profitably to the treatment.

Additional Fertiliser Experiments at Government Experiment Farm, Gwebi.

By A. G. Holborow, F.I.C.,
Assistant Government Agricultural Chemist.

Experience in the use of artificial fertilisers in Rhodesia has, up to the present, been somewhat limited, and the source of phosphoric oxide has been chiefly confined to double superphosphate, in which it occurs in a form that is readily available by the plant. Other fertilisers, however, contain phosphoric oxide, and one that might prove valuable in this respect is basic slag. Basic slag can be obtained containing 20 per cent. phosphoric oxide, and although not directly soluble in water, as in the case of double superphosphate, it allows of 15 per cent. being dissolved by citric acid solution. It is also attacked by soil water and thus obtained by the plant.

Basic slag has been found to have given beneficial results in other countries on certain soils, and even in some cases to outrival superphosphate. A convenient way of comparing the value of basic slag as a phosphatic fertiliser with that of double superphosphate would be on a money basis; accordingly, weights of each approximating the same cost have been employed, singly, and in conjunction with sulphate of potash. The trials were conducted on the same experimental area at Gwebi (red soil), and in every respect the conditions, *i.e.*, time of sowing, application of fertiliser, cultivation, etc., were the same as in the experiments referred to in the previous article.

TABLE I.

Manurial dressing per acre.	Yield of grain per acre (average of two plots). Lbs.	Increase due to manuring. Lbs.	Value of increase at 8s. per bag of 200 lbs. on farm.		Cost of manurial dressing.*	
			s.	d.	s.	d.
Plot (1)— No manure	2,061 †	...	...		...	
Plot (2)— 75 lbs. double superphosphate	2,823	762	30	5	11	3
Plot (3)— 130 lbs. basic slag ...	2,806	745	29	9	10	6
Plot (4)— 75 lbs. double superphosphate 40 lbs. sulphate of potash	2,875	814	32	6	18	0
Plot (5)— 150 lbs. basic slag 30 lbs. sulphate of potash	2,943	882	35	3	17	3

* The cost of these manurial dressings is calculated on pre-war prices.
† Average of three plots.

TABLE II.

Percentage of Cobs 6 inches in length and over.

Plot (1)	60
Plot (2)	70.5
Plot (3)	69.2
Plot (4)	68.0
Plot (5)	71.8

For the first year on the red soil at Gwebi, basic slag appears to have been applied with marked success, and it is likely to provide an alternative to double superphosphate. The fact that it contains lime should give it the additional advantage of supplying this ingredient to the heavier soils richer in humus that might need it. Unlike double superphosphate, it is alkaline in character, and on lands shewing a tendency to brakness (sourness) it should help to sweeten the soil.

Windbreaks and Hedges.

By F. B. Willoughby, In Charge, Forest Nursery.

The chief objects of a windbreak are :—

(1) to provide shelter for stock during the cold winter months ;

(2) to make it more possible to grow green winter feed for stock ;

(3) to shelter very exposed ground, so as to improve the natural pasture ;

(4) to shelter an orchard, so that the fruit and flowers are not blown off, and to help the trees to make a better and more uniform growth.

It is an advantage if, in addition, the windbreak can be made to provide the rough wood required on a farm for poles and fuel, and so repay the cost of upkeep and planting.

In most instances it is essential that the windbreak should be as high as possible, so that the protection afforded may be effective for a considerable distance. For this purpose gums (Eucalyptus) should be planted 6 feet apart each way. A windbreak cannot be too wide, and should consist of at least six rows of trees, as wind, fire and various other circumstances usually account for the first two rows.

By planting closely, the trees cover the ground very much sooner, and so do away with the necessity for cultivation to keep down the weeds and grass. A very considerable number of poles can also be cut out after about the fourth year without doing any damage. Of course the best poles should always be left. If too many are cut out, the remainder will suffer from sun-burn and weeds will spring up. It should be remembered

Eucalyptus botryoides. Salisbury.

Cupressus torulosa. Salisbury. An excellent low-branching cypress useful for windbreaks.

that gums have a very strong root system, and these roots will eventually spread to a distance of about 50 yards or even further.

The following are some of the most suitable gums for windbreaks :—

For sandy soils with a fair rainfall :
  Eucalyptus saligna.
  Eucalyptus botryoides.

For ordinary red soils :
  Eucalyptus botryoides.
  Eucalyptus rostrata (red gum).
  Eucalyptus robusta.
  Eucalyptus citriodora (lemon-scented).

For the drier parts :
  Eucalyptus sieberiana.
  Eucalyptus microtheca.
  Eucalyptus paniculata (iron bark).
  Eucalyptus crebra (iron bark).

Beefwood also makes an excellent windbreak, but it should only be planted in a single or a double row with at least 10 feet between each tree. They will not stand close planting, and their wood is of very little value. Their roots are nearly as bad as gums.

The best tree to plant near an orchard is Cupressus torulosa (Himalayan cypress). This tree is growing well under all sorts of adverse conditions here in Rhodesia, and the roots do not affect the growth of other trees. One or two rows planted from 4 to 8 feet apart will make a perfectly dense windbreak. The growth is rather slow at first, but they should average 30 feet high in seven years. The wood is a very good soft wood, likely to prove very useful in the manufacture of fruit boxes. It is an evergreen tree, and keeps its branches right down to the ground.

Another tree that is likely to do very well, especially in the very dry parts, is Lagonaria. It is an evergreen tree, with dense foliage, and is thriving in Bulawayo. Silky oak (Grevillea robusta) is also doing remarkably well there.

Jacaranda and Cedrela toona will also be found to be very useful, as white ants never seem to trouble them, but they both lose their leaves during the winter, therefore they should always be flanked by a row of evergreen trees.

If it is particularly desired to plant gums near an orchard on account of their great height, they should always have a few rows of other trees planted on the inside, so as to prevent the roots spreading. The gums will then always dominate the others, unless carefully cut back as circumstances permit.

The chief drawback to be considered when planting out windbreaks is that they are very liable to be damaged by veld fires. The only really satisfactory solution to this problem is to get some tree that will naturally kill off the grass near it, and which can stand a certain amount of heat. The Belhambra can stand a lot of heat, and where it thrives is highly to be recommended for planting along the side liable to be damaged by fire. The wood is useless, but it is extremely easy to grow, and gives good shade.

When ploughing for a windbreak, always plough the land twice, and, wherever possible, plough about 10 feet too much on either side, so that a harrow may be run along that strip every year to clean off the grass and so save the trees from fire for the first three or four years until well established.

HEDGES.—It is very difficult to find a plant that will make a really good clipped hedge for a town garden. The most promising seems to be Pittosporum undulatum. This is a well-known Australian hedge plant, and is thriving well in Rhodesia. It has a bright shiny leaf that does not hold the dust, and it clips well. The flower is not conspicuous, but is very sweet-scented.

Another very promising plant is Murraya exotica. This makes a perfect dense hedge, but it only grows about 10 inches per annum. It is standing the climate extremely well, has a shiny leaf, and when in blossom is covered with sweet-scented white flowers.

A very good hedge can be made with nearly all our flowering shrubs. Hedges of this type should not be clipped too closely, but rather just trimmed to keep them level. Among the best may be mentioned the following :—

Tecoma Smithii (yellow), 8 feet.
Tecoma capensis (kaffir honeysuckle) (red), 5 feet.
Hibiscus (red), 6 feet.
Lagerstrœmia, Indian crêpe (pink), 10 feet.
Pomegranate (red), 6 feet.
Duranta (blue or white), 8 feet.
Holmskioldia (red or yellow), 6 feet.
Bougainvillea, 8 feet.
Callistemon (bottle brush) (scarlet), 8 feet.
Spirea (Cape may) (white), 3 feet.
Plumbago (blue), 3 feet.

The figures given above are the heights at which the hedges can be most conveniently trimmed.

One foot apart is a good distance for hedge plants, but two feet may be allowed for the larger growing shrubs, especially if a high hedge is required and its density does not matter.

Very pretty clipped hedges can be made with coniferous trees such as cypress, pine, thuya, etc. These should be planted in a double row, the rows being a foot apart and the trees a foot apart in the row. This is done so that the trees, which are naturally large, shall stunt each other after reaching the desired size. Otherwise they get woody and cannot stand the severe clipping that is necessary to keep them down. Hedges of this type are hardly to be recommended, except for their beauty, as they seldom last long. Some of the trees soon start to die out, [illegible] they cannot successfully be replanted. The best of them are :—

Thuya orientalis.
Cupressus arizonica.
Cupressus lusitanica.
Pinus halepensis.
Pinus longifolia.

Trenching the ground usually results in a better and more even growth. To get any appreciable result, the trench must be at least 3 feet wide and 3 feet deep. Plenty of manure may then be added, especially when planting flowering shrubs. The top soil must be carefully put on one side, to be replaced on the top when the trenching is finished, and no manure should be added to this top-soil which will come in contact with the roots when planting.

New Crops for Rhodesia.

RESULTS OF EXPERIMENTAL WORK AT THE BOTANICAL EXPERIMENT STATION, SALISBURY—1914-15.

By J. A. T. WALTERS, B.A., Assistant Agriculturist and Botanist.

A slightly smaller number of farmers than usual visited the Experimental Station this last season, but these consisted of many who pay regular visits to the place to watch the progress of certain experiments. Farmers are always welcome at the Station, and as a rule arrangements can be made to accompany intending visitors round the plots.

The appended notes refer to crops which have been under observation for several seasons, and which have given definite indication of their utility or otherwise for agricultural purposes. Previous notes on new introductions appeared in the *Rhodesia Agricultural Journals* for December, 1913, and August, 1914. It may be useful to remind readers that the soil on which the experiments are conducted is the prevailing red soil around Salisbury, described in a report by the Chemist as "below the ordinary red soils in fertility."

MAIZE.—In addition to ear-to-row trials and breeding plots of the Salisbury White variety, a trial was conducted to determine the effect of previous crops on maize. The plots were one acre in extent, and in one case the previous year's crop was Majorda melons manured with kraal manure; in the other case the previous crop was peanuts. No artificial fertiliser had ever been applied to this land, which had been under different crops for seven years. After Majorda melons, a yield of

2,300 lbs. grain was obtained per acre; after peanuts, 2,182 lbs. of grain. Both yields are high for this class of soil, and are to be accounted to the constant rotation that is possible on a farm of this kind. The residual effect from the previous peanuts was considerably diminished by the fact that in the process of harvesting the plants had been completely pulled out of the ground and allowed to dry on the surface before being ploughed in. Our experience goes to shew that of all previous crops, wheats and oats seem so far to have the most beneficial effect on a succeeding crop of maize.

A ploughing trial was conducted on second year land, to determine the effect of ploughing at different periods:—

Early ploughing in June (average of 3 trials) … … … … … … …	1,384 lbs. maize.
Ploughing in August … … … … …	1,279 lbs. maize.
Ploughing in October … … … …	1,010 lbs. maize.

This was new land, and the only other crop that had been grown the previous season was Teff grass. This first trial seems to shew in a very marked way the advantage to be gained from early winter ploughing where this is feasible.

WHEAT.—The breeding trials and new variety introductions were continued this season. The unusually heavy rainfall was favourable to rust, and some varieties which for many years had shewn great resistance to this pest succumbed entirely. Among these was the Yellow Cross variety. Of the varieties that shewed better resistance was Victoria wheat and some of the hybrids bred at the Station; but even with these the shrivelling was so marked that the best bushel weight recorded was 57½ lbs., with an average for the best six hybrids of 51 lbs. per bushel. These figures clearly indicate that the wheat is distinctly inferior in milling qualities, and is not likely to be a serious competitor to the better class of wheats grown in winter under irrigation, or imported from the Union. Indeed, the problem of summer wheat is still far from being solved satisfactorily, and this crop cannot as yet be recommended to the farmer as a practical proposition on a large scale.

OATS.—The early varieties of oats have again proved their usefulness as a hay crop, giving average returns of about one ton of hay per acre, with a maximum yield of 3,156 lbs. hay from the Smyrna variety. New Zealand, Burt and Sidonian oats are all to be recommended for the purpose of a summer hay or forage crop.

BUCKWHEAT.—A new variety, known as Rye buckwheat, gave a yield of 640 lbs. grain per acre. The grain of this variety was smoother and less angular than the ordinary variety, and might prove useful as a poultry feed.

NAPIER'S FODDER.—Trials were conducted to ascertain the best period at which to cut this plant for ensilage, so as to obtain a satisfactory fresh growth for feeding by the month of July. It was found that when cut on 1st March, 3 feet of green growth had been made by the first week of July. When cut on 1st April, 2¼ feet of growth only had been made, and when cut on 1st May, 6 inches growth only was obtained. It would, therefore, seem advisable to cut Napier's fodder for ensilage before the end of April, if green fodder for grazing is required in July.

SUDAN GRASS.—This grass gave highly satisfactory results as a summer hay crop, and continues to grow freely as a winter green forage crop under irrigation. Indeed, the best results seem to be obtained from this grass when utilised as a summer hay crop, and subsequently as a winter forage crop on irrigable lands. The plant is permanent here at Salisbury, and seeds freely. Small quantities of seed will be available for distribution this coming season.

COW CANE (*Sorghum sp.*).—A valuable fodder plant introduced from Australia, and resembling Napier's fodder in habit of growth, except that the foliage is denser and more compact on the stem, which is flattish in shape. No analyses or feeding tests have as yet been made, but the plant seems distinctly promising for the same purposes as Napier's fodder, with the additional advantage of greater leaf growth and a distinctly lower habit of growth.

INDIAN CANE (*Sorghum sp.*).—Another variety of fodder somewhat similar to cow cane, but less promising on the red soils of Salisbury. It is being retained with a view to comparative trials on other classes of soil.

GUINEA GRASS (*Panicum maximum*).—This indigenous grass has maintained its high reputation as a winter fodder, and is recommended as a mixture with Napier's fodder when this latter is laid out in paddocks. Alternate rows of each at 6 feet apart each way has proved very satisfactory at the Experiment Station.

MOLASSES GRASS.—This grass, which has been under observation for several years, is spreading rapidly from seed. This season it started flowering towards the end of May and continued in flower during June, standing about 4 feet high at the period of full maturity. Its handsome heads entitle it to a place in the garden, and a small quantity of seeds will be available for distribution this coming season. Its value, as has been pointed out before, lies in its late ripening habit as a hay grass, being ready for cutting only when the rains are well over.

LUCERNE.—Attempts to grow this valuable crop under irrigation on the prevailing red soil of Mashonaland are now in progress at the Experiment Station. Other legumes are being tried under similar conditions, with a view to enabling the farmer to provide some green leguminous food for winter feeding. The other legumes consist of Melilotus, Serradella, Goat's Rue, Egyptian Clover and Beggar Weed. The principal difficulty in the case of lucerne is the presence of a clayey sub-soil sufficiently near the surface to cause the plants to become water-logged in the wet season, a condition which is liable to kill out the lucerne plants once the roots reach the clay, which they cannot penetrate.

COWPEAS AND BEANS.—Every plant of these crops on the Station was attacked by the stem maggot. These maggots attack the stems of these plants by boring into them, and, although the plants are not killed, they never recover properly, and the yield is reduced enormously. The best yield of cowpeas obtained this season was at the rate of 360 lbs. per acre over 1¼ acres. Under these conditions this valuable crop cannot safely be recommended, in spite of the high feeding qualities of its beans, and its utility as a green manuring crop.

PEANUTS.—The following tests were carried out with this crop :—

Variety Trials.—Average yield of all varieties—790 lbs. per acre. Highest yield: Tennessee Red—940 lbs. per acre. Earliest maturing varieties: Spanish, 4½ months; Tennessee Red, 5 months. Latest variety: Virginia Runner, 6½ months.

Distance Planting.—

Plants 30 ins. by 12 ins. gave a yield of 732 lbs. per acre.
Plants 30 ins. by 8 ins. gave a yield of 864 lbs. per acre.

Method of Planting.—Whole nuts cracked were planted in hills 30 ins. by 12 ins., and shelled nuts two in each hill were planted at the same distance apart.

Whole nuts cracked gave a yield of 756 lbs. per acre.
Shelled nuts two kernels in each hill gave a yield of 656 lbs. per acre.

Early versus *Late Planting.*—

North Carolina planted 3/12/14 yielded 798 lbs. per acre.
North Carolina planted 5/1/15 gave a very low yield.

Repeated experiments have shewn that early planting is essential for this crop.

Seed required per acre.—With the Spanish variety one bag of unshelled nuts, weighing 80 lbs., sufficed to sow three acres at the rate of one nut per hill; rows 30 ins. apart, with 9 ins. between the plants.

LINSEED.—As usual the yields from this crop were relatively low, and at present market prices hardly warrant the farmer to grow it as a money crop. It has, however, proved extremely useful for feeding on the farm, particularly in rations for bulls, dairy cows and calves. The average yield for all varieties worked out at approximately 300 lbs. per acre, with a best yield in the case of a new variety—Vitebsk—of 402 lbs. per acre.

ROOT CROPS.—Of the root crops experimented with, mangels were practically the only crop that gave satisfaction. Sugar beet gave yields below the paying margin, and field radish, field cabbage and kohl-rabi were failures, in spite of a favourable season. Three varieties of mangel were sown towards the beginning of December, 1914, and the yields were taken in July at the time when this crop is usually fed to stock. The yields obtained were as follows:—

Half sugar mangel	12.4 tons per acre.
Mammoth long red	11.8 tons per acre.
Yellow globe	10.2 tons per acre.

The quality was good throughout, there being practically no hollow roots. The previous crop was Egyptian clover, and the land was manured with 6 tons of kraal manure.

Fibre Crops.—*Hemp Varieties.*—Six of the leading varieties were tried under favourable conditions, but one only—Chinese hemp—gave the slightest hopes of producing a payable crop. But even this variety did not do sufficiently well to warrant its recommendation for trial among farmers.

Sunn Hemp (*Crotalaria juncea*) did exceedingly well as usual, but the yield of fibre per acre has not proved sufficiently heavy to undertake its cultivation on a big scale.

Ramie Fibre (*Boehmeria nivea*) has done well for many years, and seed in small quantities is available for trial among farmers.

New Zealand Flax (*Phormium tenax*).—These plants have gradually died out since the trial was started a few years ago.

Sisal Hemp (*Agave sisalana*).—A good stand of this fibre is now in its sixth year. A few of the plants have poled, but there is no sign of any of the fungoid diseases which frequently attack these plants in the Union.

Mauritius Hemp (*Fourcroya gigantea*).—Another good stand of strong, vigorous plants now in its sixth year. Very few of the plants have poled, and the yield of leaf is exceedingly heavy. An estimate by a fibre grower from Mauritius places the yield of leaf at nearly twice the quantity obtained in that island.

Miscellaneous Crops.—*Chillies* (*Capsicum vars.*).—Three varieties were tried as field crops with great success, and seed of two of these varieties will be available for distribution this coming season. No weights were taken, but the plant attained maturity without any set-back in the way of pests.

Poppies as a field crop were an entire failure, owing largely to several heavy rains, which destroyed the young plants in the open.

Dedman's Bean (Mucuna sp.).—This useful variety of velvet bean has again failed to flower at Salisbury, although the growth has been vigorous throughout. It has not been touched by frost, although the ordinary variety next to it was completely cut down.

Laing's Bean.—Another variety of velvet bean, free from the irritating hairs on the ordinary variety. This is now being propagated on a larger scale, with a view to future distribution.

Cyperus esculentus.—This crop in a dry situation produced its small edible tubers in large quantities, but these were all attacked by insect pests. In moist situations, this plant is likely to become a pest exceedingly difficult to eradicate, although, where feasible, pigs can be turned in to feed on the tubers.

Rice Bean.—A small and attractive variety of bean, which was the only variety to give a satisfactory yield. Like the other beans, it was attacked by the stem maggot, but it was more successful in setting seed than any other variety.

Merino Sheep in Rhodesia.

By J. H. Edwards, Daisyfield.

Having been sheep-farming all my life, it may be interesting to recount some of my experiences for the benefit of readers of the *Journal*. The breed of merino sheep I keep are Rambouillets, which, as is generally known, come from the north of France. Spain is the original home of merino sheep, but since they were exported thence the breed has been sub-divided into various types. Several of the original stock which were imported into France were crossed with the native sheep of Northern France, and their progeny became known as Rambouillets, taken from the province of that name.

The first point for the prospective breeder to consider is as to what type of animal is likely to best suit his particular environment, climate, etc. If he is farming in a dry, dusty or wind-swept district with a scanty rainfall, then he must have a sheep of very strong natural constitution, covered with a strong fibred wool well packed on the body. Length of staple, however, must also be kept in view. Such a merino will be found to eke out a living against the most adverse conditions, and generally speaking I would say in South Africa a strong woolled sheep is desirable. The natural tendency in South Africa is for wool to weaken in structure, and therefore, as stated, constitution in practically all cases must be the foremost consideration.

To anyone who knows his subject, first sight will generally tell whether an animal has a good constitution or not. The animal should be neatly built, with bones level but not coarse; the back should be level; the ribs well sprung; the neck broad and deep, and the chest well developed. The hindquarters should be broad and long, with a good depth of loin. The under-line should be straight. Symmetry of form is a necessary feature, and this means that all the quarters must be in proportion with the head and neck and in keeping with the rest of the body. The head should be broad and strong, but not too large; skin thick, soft and velvety; ears short, thick and soft; the horns strong, broad at the base and with an even curve, neither too close nor too wide from the jaw; of the two, a curve close to the jaw is preferable. The eyes should not be wild-looking, and the nostrils should be large and wide apart. Reject any animal with a short under-jaw, as this is a fatal defect. It is also a fault if the lower jaw is long, but discretion must be used in this case, as this is often due to hard feeding when young. A heavy front fold of the skin is desirable in stud animals, which should shew a true wool. They should be evenly covered with wool of as much of one type as possible, although the wool usually varies slightly in strength at different parts. As regards density and length, the animal should be evenly clad.

The ram should shew body and substance in his wool. A bold body is necessary in a good stud ewe, but with a ram, if he is to be a reliable sire, he must have it in an exaggerated form, as he is anything from 50 to 75 per cent. of the flock. Extremely large size of body and good quality of wool are seldom found together, but I would recommend for this country fairly good sized well-built animals.

As stated, density of wool is an important point. Every animal should have wool as dense as possible without sacrificing length to too great an extent. The correct method of testing density is to open the wool and observe the amount of skin visible. The less skin there is visible, the denser the wool, and *vice versa*. Evenness, length and brightness are all important factors, and the breeder should be exceptionally careful to see that the sire has a good colour.

Sheep growing a wiry and hard wool should be closely culled from the flock, as these types of wool are particularly objectionable. The yolk plays an important part in the production of good wools. This must be evenly distributed and bright, but it must not be of a sticky nature. I cannot too strongly condemn a yellow adhesive yolk.

A hollow in the back, just behind the shoulder, is a very bad point. This, with malformation of the shoulder blades, is known as "devil's grip." The shoulder blades should never rise higher than the backbone when the sheep is holding its head up. A thin delicate neck and a pinched girth should also be avoided.

It is my opinion that merino sheep have come to stay in Rhodesia. Blue-tongue may be troublesome, but we can inoculate against this, while we can dose for wireworm. I must say that I should like to see a very strict Scab Act passed in this country. It is my opinion that scab can be found in almost every flock in Rhodesia. Now, when there are very few sheep in the country, is the time to fight this dread disease, and I am afraid that unless very strict measures are enforced without delay, it will get the hold it has in the Union, where thousands of pounds are being spent every year in the endeavour to overcome it.

[Mr. Edwards, in his interesting article, does not express any opinion as to the type of country in Rhodesia he considers most suitable for merino sheep. Judging from the conversation Mr. R. C. Simmons, Chief of the Animal Industries Branch, had with him, and from the type of country Mr. Edwards has chosen to farm in, we conclude that he considers high-lying, dry open country preferable to heavily wooded or vlei country. —Editor.]

Useful Measurements for Maize.

By J. A. T. WALTERS, B.A., Assistant Agriculturist and Botanist.

The measurements given below are based on a number of careful trials made at the Botanical Experiment Station, Salisbury, during the month of July, 1915, with the Hickory King and Salisbury White varieties. The enquiry was undertaken in response to repeated requests from farmers and others who desired to have information on such questions as the storage of grain, the size of hocks to be constructed for a given number of bags of maize expected, and an estimate of the number of bags of grain to be obtained from a given quantity of cobs. It will readily be understood that there are no absolute figures in connection with such matters, but the results given are sufficiently approximate to afford useful data upon which the farmer can base his calculations. In some cases the figures given seem to differ from the old adopted data. Thus it will be seen that two bags of cobs will yield over one bag of grain, but only on condition that they are properly filled. Again, it used to be said that a cubic yard of cobs yielded three bags of grain. This was approximate enough for rough computation, but actually it is found that a cubic yard will yield $3\frac{1}{4}$ bags, or 648 lbs. of grain. In the measurements for tanks, the figures are based on an average of 45 lbs. of grain to the cubic foot, for although one cubic foot will weigh only 43 lbs., it is found that in considerable quantities where much pressure is obtained, a cubic foot of grain will weigh a little over 45 lbs. Much variation was shewn in the weight of a sack of cobs. When selected ears only were chosen, a weight of 150 lbs. per sack was obtained, but with nubbins only, the weight came to 126 lbs. The figures given below are those produced from a mixed sample in an average crop.

One sack of grain
weighs 200 lbs.,
contains 4¾ cubic feet,
or 3 2-3 bushels of grain,
equals 1¾ sacks of cobs,
or 8¼ cubic feet of cobs,
or 6¼ bushels of cobs.

One bushel of grain
weighs 55 lbs.,
contains 1¼ cubic feet,
or 5-18 sack of grain,
equals 2 1-5 cubic feet of cobs.

One cubic foot
of grain weighs 43 lbs.,
of cobs weighs 29 lbs. gross weight,
of cobs equals 25 lbs. grain (approximately),
and therefore 8 cubic feet of cobs yield one bag of grain.

One sack of cobs
weighs 136 lbs.,
yields 110 lbs. grain,
equals 2½ cubic feet grain (approximately).

Maize in the Hock.—It follows from the above figures that if a hock is required for the storage of maize cobs, a capacity of 800 cubic feet (or 30 cubic yards) will be required for every 100 bags of grain expected. In the same way, if the hock has been constructed for the storage of maize cobs, the number of bags of grain in a given volume of cobs may be ascertained by dividing the cubic content in feet by 8. Example: If the cobs in a hock measure 50 feet long, 12 feet broad and 4 feet high, the cubic content is equal to 50 by 12 by 4 cubic feet equals 2,400 cubic feet. Divided by 8, this gives 300, the number of bags of shelled grain that will be obtained by shelling these cobs.

Maize-holding Capacity of Circular Tanks.—The cubic content of a circular tank is obtained by multiplying the square of the diameter by .785 and by the height of the tank. Example: A tank 8 feet high with a diameter of 5 feet has a cubic content equal to 8^2 multiplied by .785 by 5, equals 251 cubic feet. To ascertain the number of bags of grain it will hold, multiply the cubic content in feet by 9 and divide by 40. Thus the tank quoted above, with a content of 251 cubic feet, will hold 251 multiplied by 9 divided by 40, bags of grain: equals 56½ bags.

The following tables shew the size of circular tanks required to hold a given number of bags of shelled grain:—

For tanks 6 feet high a diameter of 6 feet 9 inches is required to hold 50 bags, and a diameter of 9 feet 6 inches to hold 100 bags.

For tanks 8 feet high a diameter of 5 feet 10 inches is required to hold 50 bags, and a diameter of 8 feet 2 inches to hold 100 bags.

For tanks 12 feet high a diameter of 4 feet 4 inches is required to hold 50 bags; a diameter of 6 feet 1 inch to hold 100 bags, and a diameter of 9 feet 8 inches to hold 250 bags.

For tanks 15 feet high a diameter of 5 feet 5 inches is required to hold 100 bags; a diameter of 7 feet 8 inches to hold 200 bags; a diameter of 9 feet 6 inches to hold 300 bags, and a diameter of 12 feet 2 inches to hold 500 bags.

The Farmers' Tour.

THE CATTLE INDUSTRY IN BRITAIN.

By W. M. **Leggate**, Rhodesian Delegate.

Of all that was seen on the farms in England and Scotland by the South African farmers, nothing impressed them so much as the size, the milking capacity and rapid growth of British cattle. The organisers of the tour gave cattle the premier place as the subject of our study, and no one with any interest in the subject could fail to learn much of profound importance from the men we met, who are acknowledged to hold the highest place amongst the stock breeders of the world.

The British breeder has usually one of two objects: to produce the largest amount of beef in the shortest possible time, or to produce the largest possible daily supply of milk. Even the dual purpose cow breeder requires to seek one of these objects, if he is going to endeavour to improve his cattle. A most successful breeder, Lord Rothschild's manager, assured us that one who sought both of these objects at the same time would achieve neither. A few remarks on the achievements of British breeders during the last few years are a fitting preface to an enquiry how we may follow their example.

If we take the beef animal first, the progress with it has been prodigious. For many years the Argentine has been a heavy buyer of the best that could be produced among Cruickshank (beef) Shorthorns, Herefords and Aberdeen Angus, and the prices realised have stimulated production. Those of us who left Britain ten years ago can hardly credit, without actually seeing the animals, the size that is now obtained and the short period within which the maximum growth is reached.

In that period (viz., ten years) the age when the maximum weight—over one ton—is reached, has been reduced from four to three years. That is an enormous increase in the efficiency of an animal as a machine for converting cattle foodstuffs into meat. What it means in the quality of the meat was admirably explained in Mr. Bevan's article in the April number of this *Journal*. The beef animals we saw struck one with their square, packing-case appearance. Their backs were broad and flat, as broad as the bottom of an arm-chair, with the hip bones well covered with flesh and not prominent. The ribs were deep and the thighs well let down. One two-year-old animal we saw at Dalmeny—a Shorthorn—was 1,850 lbs. Compare that with our Rhodesian standard, and we are ready to confess that we have something to learn somewhere.

Turning to the milk animal, the progress has been no less marked. Of recent years the consumption of fresh milk has greatly increased in Britain, and animals yielding a good supply of milk have nearly doubled in price. Four to five gallons per day is not an unusual milk supply from one cow. The keeping of milk records, which the Board of Agriculture has done its utmost to encourage, has been the main factor in this general advance in the individual yield. Cows of small yield have been weeded out, and only bulls from the best milking cows have been used. At Tring, where selection for milk had been made from the usual class of Shorthorn (not the Lincoln Red) for a few years only, the milk records compared favourably with those of pure dairy animals we saw elsewhere. The cow that had been used as the basis of the herd yielded over 1,000 gallons a year for ten years, and in one year yielded 1,500 gallons. She was at the time of our visit seventeen years old. The manager remarked that a cow yielding four to five gallons per day when in full milk was no loss if at seventeen years old one had to bury her, but nevertheless he could get £20 for one of these cows from the butcher by stopping the milking and fattening her for a few months. His experience was that with a milking Shorthorn, if one stopped milking, one got beef in place of the milk. "The milking Shorthorn is the coming breed of the world," he added.

The records from an ordinary commercial dairy farm I visited in Essex are even more valuable to us as an example.

as shewing what results have been obtained outside pedigree strains. In this particular dairy farm every penny of expense was calculated, and there were three clerks engaged. The income, which was £9,000 gross from milk alone, the milk being sold at 1s. 4d. per gallon, warranted their employment. The yield of every cow was known to a gallon for every year throughout her life. The average throughout was three gallons per head per day. Half a dozen different records each were over 1,100 gallons per annum. These were milking Shorthorns, with a strain of Friesland added; but the owner said he could not increase the Friesland blood without reducing his milk below the legal standard.

These figures of beef and milk production are startling to the Rhodesian stock-owner. It is the average British farmer, not the pedigree cattle breeder, that shocks our complacency most. The path of our progress towards the rapid and huge returns that the British stock-keeper enjoys seems to me to lie along three lines of reform regarding (1) food, (2) water, and (3) breeds. Our deficiencies under these three heads are so great that, until these are eliminated, we cannot isolate, and therefore cannot measure the alleged effects of the tropical sun. The tropical sun is like malaria—it is blamed for much of which it is not guilty.

First, regarding food. The most miserable looking lot of calves we saw were the subject of a feeding experiment at Woburn Experimental Station. These calves were fed for four weeks with one gallon of whole milk daily, and thereafter with one gallon of separated milk daily, and in addition some calf meal or other food, besides grass to taste. That was meant to be a usual calf ration, and it was obviously much less than what the bulk of the calves we saw got. It would thus appear that where we cross a native cow yielding half a gallon of milk daily, with a pure-bred bull, however excellent the calf may be when it is born, it has not the chance of developing the frame that its paternal ancestors had. It is bound to be stunted in growth, even if every other condition here were similar to that in Britain.

The ideal—or, rather, the only sound principle of cattle feeding—is not to have any check to the growth till the animal is ready for the butcher. It is to be feared that in years of drought at least, judging from the fact that animals actually die of starvation, many herds of cattle lose condition during the winter. Do we exaggerate if we say the average herd of cattle suffers a loss of condition during the winter? If so, it is bad, wasteful management that costs the stock-owner hard cash which he might have in profit. The British farmer has a winter so severe, compared with ours here, that perhaps ours hardly deserves the name, and should rather be called the dry season. Yet his stock are never in danger of death from starvation. He pays his rent from the milk or beef which they yield, and a diminution of these diminishes his income, and he will not have a diminution if he had to bring mealies 8,000 miles from Rhodesia to feed his cattle with. Yet he sells his milk and his beef for even less than we sell ours!

When we were at Windsor Castle and first saw the noble animals that English care had brought to such a state of perfection, one delegate remarked, looking at the long, luscious, green grass that carpeted the ground, " Had we grass like that, we might have cattle like that too." When we reached Dalmeny another delegate, looking at a splendid herd of Scotch Shorthorns, asked if these cattle were stabled throughout the winter. The reply was " Yes." He next asked, " Do they fall off perceptibly in condition? " and the reply was that they did not. That was one of the most important questions a Rhodesian could ask, because it went far to prove that what could be done with winter feeding in Britain could be done here. The daily ration for a cow at Dalmeny was 7 lbs. bran, 2 lbs. bean meal, 3 lbs. cake, and also hay, straw and turnips. The ration the Essex dairy farmer before mentioned gave to his milk cows was one bushel of brewer's grain, cotton meal and dry grain mixed, besides hay, straw and turnips. He gave each animal 8s. worth of food per week. The Tring manager gave his pedigree stock foodstuffs costing 1s. 6d. per day during the summer and 2s. 6d. per day during the winter. Yet these three farmers who fed their stock so lavishly were three of the most successful farmers in Great Britain, each of them making a handsome income. It is evident that what we have been told about the necessity for winter food has not been exaggerated. The lesson should be driven home with a sledge hammer.

The second line of reform for the Rhodesian stock-owner is with regard to water facilities. At Windsor the stock at the time of our visit got a supply of moisture with every mouthful of grass. That seemed rather discouraging to the Rhodesian looking to see how he could reproduce the Home methods of stock feeding. At Dalmeny we learned that the cattle still throve on dry hay during the winter, and that was immensely encouraging, though there they had a large supply of turnips, which, fed twice a day, was an important feature in the supply of moisture. At Armstrong College, Newcastle, we were supplied with a printed bulletin (No. 4) describing experiments in the feeding of dry meals, and the same meals drenched in hot water according to the usual practice. The conclusion drawn from these experiments was that the cattle fed on dry meal drank more water after they were turned loose than those fed on "crowdy," but that the effect on the milk of the extra water fed was so negligible as not to make it worth while to do the extra work in drenching the meal. That experiment was of value to Rhodesians, for here the advantage of being able to feed our large herds with dry meal is very great. It comes to this—that if only we give our cattle plenty to eat, there is not much of a drawback in our bone-dry veld, provided the cattle have access to water at least twice a day and have not to walk too far either for their food or their water. It is the excessive exercise and the long breaks between the drinks of water that make cattle lean during the winter, when otherwise they would be in good condition. The drier the food, the more necessary it is to have water accessible to the stock. In Essex last year the rainfall was 15 inches—the same as some dry parts of Rhodesia. The grass, when I saw it in August, strongly reminded me of the Rhodesian veld, and had the same shrivelled appearance; and the root crops were also not unlike our own, with frequent gaps and small bulbs. Yet this was the successful dairy farm I have spoken of; but I noticed that there was a water tap at each cow's trough, and when the cattle were fed with the dry hay, a little water was turned on to give them the opportunity of a drink with it. It was clearly a first and a special care of the farmer to give his stock plenty of water, and in that we have a striking lesson for ourselves, who farm under very similar conditions.

The third line of reform—viz., improvement of breed—I have mentioned last, because the two previous reforms ought to precede it. It is useless improving our breed if we do not mean to feed the cattle, water them and tend them. If a farmer has not sufficient pride in his stock to take a daily personal care of them, he may find that native or Afrikander stock suit him best; but if a farmer is prepared to feed his stock with all that they require, to give them the water they need, and the daily attention that alone will ensure their well-being, then he ought not to be content till he gets some of the splendid blood that British stock have to offer. He is losing money every day till he does get them. For them alone the market of the future is a certainty, and success will surely bring him a great reward.

Analysis of Peanut Oilcake.

By A. G. Holborow, F.I.C.,
Assistant Government Agricultural Chemist.

At the Salisbury Oil Factory ground nuts are subjected to pressure, and a fine quality Arachis oil is obtained. This oil is sold as " salad oil " at 2s. 9d. per bottle of 26 oz. capacity. If the remaining cake be heated and again put under pressure, a further quantity of oil is obtained, and the resulting cake is placed on the market at £10 per ton as a feeding stuff for stock. The figures below shew the composition of the cake on analysis at the Government Agricultural Laboratory.

	Salisbury Peanut Cake. Per cent.	Linseed Cake. Per cent.
Moisture	10.38	11.7
Ash	3.98	6.7
Ether extract (fat)	10.96	11.4
Proteids	41.18	28.0
Carbohydrates	29.82	33.2
Fibre	3.68	9.0
	100.00	100.0

For comparison, the composition of an average linseed cake is here quoted. It will be seen that whilst the figures for carbohydrates and fat are not widely divergent, the protein of the peanut article has a very decided advantage. It is claimed that the protein of peanut cake is more easily digested by cattle than that contained in other feeding stuffs.

Investigators in America have shewn that the percentages of digestibility of the protein, carbohydrates and fat in peanut meal are as follows :—

Protein	90.1
Carbohydrates	96.2
Fat	86.2

These figures, however, require corroboration by feeding experiments with local cattle under Rhodesian conditions.

The " albuminoid " or " nutritive " ratio calculated upon the above American figures of digestibility is 1 : 1.3. Peanut cake has proved on trial elsewhere to be a useful feeding material for cattle.

Preservation of Eggs in Waterglass.

The following information was furnished by Mr. Frank Sheppard in reply to a request for particulars regarding the preservation of eggs in a water :—

Boil a quantity of water, then let it stand in the air till quite cool again. Into this water pour the waterglass, in the proportion of one measure of waterglass to ten of water (sometimes a weaker mixture is used—one in fourteen or sixteen—which appears to work satisfactorily, but one in ten is the usual). The preserving vessel should be of earthenware, and placed in a cool position. Pour into it as much mixed waterglass as will cover the eggs well as they are stored. The eggs must be collected as often as possible, twice a day at least, and put in the waterglass as *fresh as possible* once they are cool. It is also essential that they should be *clean*.

If the eggs do not sink when placed in the waterglass the solution is too strong, and more boiled water must be added.

The preserving vessel should be provided with a lid. The cost of preserving eggs in waterglass in England is 1½d. a dozen.

Poultry Keeping for the Rhodesian Farmer.

By Frank Sheppard.

Now that the early hatched cockerels are shewing signs of maturity, we again ask ourselves the question, " What are we to do with the surplus? "

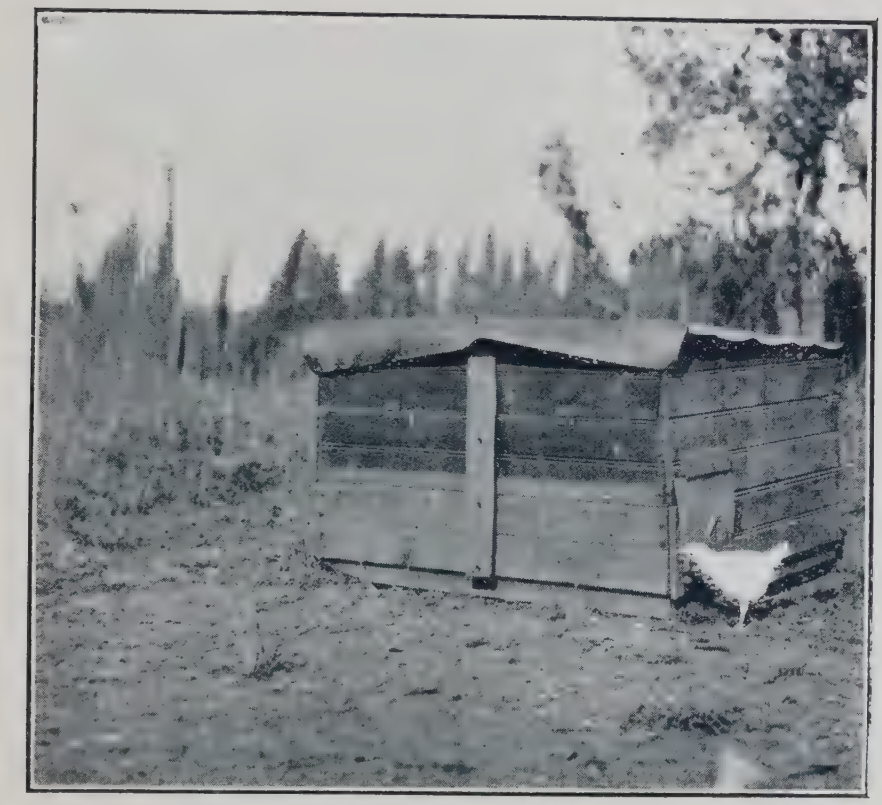
Poultry keepers in every country in the world are faced with this problem annually, and in a great many cases it is solved in a manner far from profitable. An interesting paper on this subject was read before the Conference of Poultry Farmers at the Hawkesbury Agricultural College, New South Wales, in 1912, and published by the Department of Agriculture. As the great majority of poultry in Rhodesia are light breeds, as in Australia, many of the remarks put forward in this paper and in the discussion which followed should prove useful to this country. The theory put forward in the paper that it paid to caponise and fatten light breeds, received much adverse criticism. I do not advise caponising or fattening in this country, as it will bring no benefit to the producer unless he can sell the birds by weight. There is always a demand in the towns for fair sized table birds at a market price of three shillings and sixpence, which should bring in a fair return. Poultry keepers who are in touch with private customers and can sell by weight will be repaid by fattening. As we never have a glut of table poultry on the market, caponising to keep the flesh of the birds young and tender until prices are better, hardly applies to this country. If, owing to the cost of rearing and transport to the market, the producer who is not in touch with private customers does not get a fair return for his birds at market prices, then he should kill every cockerel hatched as soon as the sex can be distinguished; or, if kept a little longer, they should be killed and boiled down to feed the pullets and laying hens on. A few, of course, should be kept for the home table and stock birds. If the cockerels are kept and reared, they must be penned up, or kept some distance from the laying hens and growing pullets. Nothing looks worse or does more harm amongst a flock of layers than a crowd of three-quarter-grown vigorous cockerels, fighting, worrying the hens and taking all the tit-bits in the food. If the birds are reared and kept for either the market or fattening, they should not be kept on hand a single day longer than is absolutely necessary, as each day they are fed after they have reached a saleable condition is money lost to the owner. The occasion will often arise when the outside farmer has perhaps a dozen or so cockerels ready for market, but as such a small number is hardly worth sending, he keeps them three or four weeks longer or so until more grow up and he can send in two or three dozen. This means that these dozen birds give no return for their month's keep and attention, but should he make enquiries amongst his neighbours, he will in many cases find they too have a few birds ready for market, and together they can make up a good consignment. This is, of course, co-operation in a small way. I do not at present intend to dwell on this subject, but I am sure there are few farmers in outlying districts who do not realise that some system of co-operation would minimise many of their present difficulties with regard to the disposal of poultry produce.

Looking back on the past show season, we can safely say that, taking into consideration the present troubled times, the entries in the poultry sections of our agricultural shows, especially that of the Mazoe Farmers' Association, have been highly satisfactory, and that the exhibiting of poultry is increasing in popularity. The bird bred for exhibition points alone we do not see, and we do not expect to, as we have no use at present for this type of fowl; but we have seen many healthy, vigorous, clean-legged, pure-bred birds which are the type of bird we want in Rhodesia. In the classes for young stock we have seen many well-developed birds of good size, which shews that, in spite of the scarcity of suitable food for growing youngsters, many exhibitors are able to get size and bone into their birds. In the classes for turkeys we have seen many really useful-looking male birds, not the heavy massive bird fit only for the Christmas market, but medium-sized healthy birds with straight keels, which make good breeding stock. The classes for eggs were generally well supported, but many of the entries shewed lack of uniformity, and in one or two cases the exhibitors appeared to have taken little regard as to freshness. These classes, I noticed on one or two shows, were entered in the produce section—not the poultry. I am inclined to think that when this is done the class is liable to be missed by many would-be exhibitors who, having little interest in the other sections, peruse the poultry section only of the schedule with care.

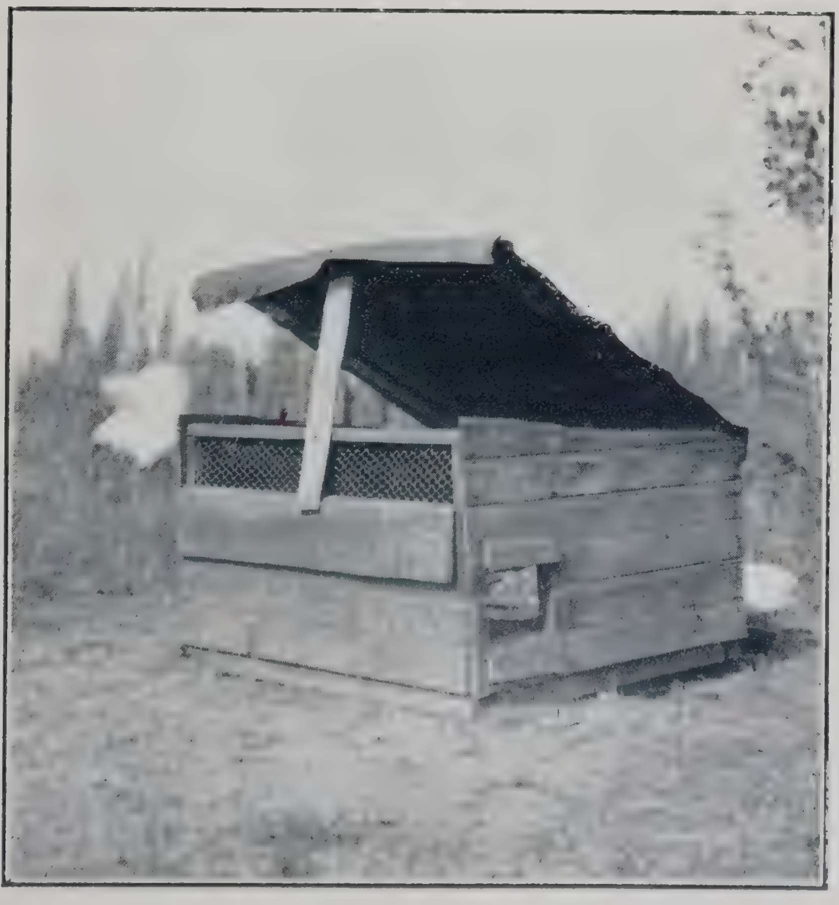
Early hatched young stock should now be well past the brooder stage of rearing. Their sleeping quarters should be as large and airy as possible without becoming cold at night; and when constructing the houses for growing birds, or in fact any poultry, it should be borne in mind that they require seven times as much fresh air as a horse in comparison to its size. The first illustration shews a suitable type of house for chicks from three weeks to a month old. The roof is hinged at the back, and can be raised or lowered and fixed in any position by the bar in front, in which are several holes which fit into a screw in the front of the house. Ventilation holes are provided at the top. As the chicks develop, the ventilation can be increased by lowering the top board of the front of the house, which is hinged at the bottom. The opening thus made is covered with fine mesh wire-netting. In the illustration, the house is shewn with the top raised and the ventilation board lowered, in which position they remain from daylight till dusk, admitting fresh air and sunlight—the poultry keeper's best and cheapest disinfectants. Far too little importance is paid to the construction of many fowl houses in this country as regards the admittance of fresh air and sunlight—two of the most essential factors for keeping our houses and birds free from vermin. For six or seven months at least during the year there is little fear of rain, and the whole of this time the fronts of the houses should be left entirely open, except, of course, for the wire-netting, and if they are placed facing a north-westerly direction, they will get the full benefit of the late afternoon and evening sun. Many houses I have seen appear to have been made with the intention of excluding light and air—the greatest mistake a poultry keeper can make in this country. The small door at the side of the house is, of course, for the birds to enter. Should the birds when placed in the house be two few in number to generate the required warmth during the night, the capacity may easily be diminished by means of a diaphragm which can be used as a false roof resting on four screws placed in the corners of the house, which can be raised or lowered according to the head space required for the chicks. The diaphragm can easily be made on the same plan as those used at the bottom of Cyphers incubators—that is, just a wood framework covered with sacking. The regulation of the ventilation and head space for the birds is quite simple with the use of the diaphragm, but it is more satisfactory, and gives less trouble, if the full complement of chicks can be put into the house and no diaphragm used. The size of the house depends, of course, on the number of chicks it is intended to rear.

The second illustration shews the house with top and ventilation board closed.

Now that the early mornings are somewhat chilly, the houses for growing youngsters should be placed, if possible, so as to get the first rays of the sun, for, if this is done, it is possible to liberate and feed the chicks earlier than if they are in a damp or shaded position. This only applies, of course, to chicks just out of the brooder stage—six weeks or two months old birds will not be affected by the cold. The chicks should be able to sleep comfortably. If a visit is paid to them at night time and they are found to be all huddled together in a corner, or if, when liberated in the morning, they appear with ruffled feathers and a half-starved appearance, it is a sure sign that they have spent a cold night. If, on the other hand, the house has been too warm, this is easily noticed by the odour which arises when it is opened. As the manner in which the chicks leave their house when liberated in the morning is one of the best indications as regards their health, the early feed should not be left to natives. A sick and ailing chick may easily escape the notice of the attendant on his periodical visits with the food bucket and water can during the day, but, when the house is opened at daybreak and the litter raked over, there is little chance of failing to notice an invalid.



Suitable type of house for chicks from three weeks to a month old.



Same house as above with top and ventilator board open.

Early hatched cockerels should now be separated and penned up. If they are intended for market purposes, the lack of exercise will keep the flesh soft. The growing pullets should have as much range as possible, and plenty of shade and cover to escape the attacks of hawks. From my own experience of Rhodesian hawks, I find they are just as likely to take a bird from the breeding pens amongst a maze of wire netting as from the open bush.

Few poultry keepers appear to realise the value of charcoal to birds of all ages. It purifies the blood and absorbs the noxious gases generated in the digestive organs and neutralises their effect. Crushed charcoal should always be within reach of adult stock, and if finely ground and mixed in the soft food, one pound to every hundred pounds of mash is about the right proportion. It is also very beneficial to small chicks, one teaspoonful to every quart of mash. If given to excess in the soft food, it is injurious to the birds. When this is the case, the droppings will be hard and dry and probably smeared with blood.

Extracts from the Annual Report of the Citrus Expert.

Since my taking up this appointment and assuming duties in the beginning of October of the year under review, I have occupied most of the time touring various districts, with a view to finding out the possibilities of the different localities for planting citrus trees, and also giving advice to planters and intending planters. From what I have actually seen, I consider the possibilities of citrus growing in some localities of Southern Rhodesia are excellent, provided planters take up the business in the proper way, and are prepared to do the right thing by their orchards.

It is to be regretted that there seems to be a very general opinion among farmers here that citrus fruits can be raised profitably without irrigation, and with very little attention otherwise. While touring the country visiting farmers, corresponding with them, and in the *Agricultural Journal*, I have endeavoured to point out that this is an entire fallacy.

The chief difficulties appear to be in procuring good and reliable trees to plant, and the expense of putting in a satisfactory irrigation system. I have everywhere advised intending planters to let the business alone unless they can secure an adequate supply of water for irrigation purposes, even provided they have good situations and suitable soils, while to those who have already planted without an irrigation supply I have suggested that they should rectify the error without delay, if possible.

I have found that great interest is taken in citrus culture in every district visited, and farmers are keen to learn anything concerning this branch of agriculture, and on the whole are anxious to go in for citrus planting, as they realise that it will be a profitable undertaking, but in many cases, I fear, are deterred by lack of funds from doing very much.

It appears to me that the only means of handling the orange crop will be to inaugurate packing houses on co-operative lines, where the fruit would be brought in by members and there graded, sized and packed, and consigned to market under one set of brands, for that particular district, for the different grades of fruit; each grower receiving his returns *pro rata*, *i.e.*, his fruit on arriving at the packing house would be graded, sized and packed, so that his returns would be on a par with every other member of the association in each particular consignment, according to grade.

I suggest this, as the expense of marketing by each individual grower would be greater if performed by himself on his farm, and it would, moreover, be almost impossible to put up an even standard pack, which is absolutely essential for the export trade. I am referring, of course, to the small growers, whereas a grower who had sufficient fruit to warrant a packing house and plant of his own would naturally market his stuff under his own set of brands.

In view of the fact that growers in this Territory at present have little or no knowledge of the necessary work attached to the preparing of oranges for export overseas, it would be almost impossible for me to advise each separate grower, whereas if each district association, in the citrus-growing centres, had their own co-operative packing house, it would be quite possible to make fairly frequent visits during the packing season, and by this means it would be possible for the small grower to get equally as good returns for his produce as the man sending away large consignments.

The orange crop for the ensuing season will be light, which is due to some extent to lack of irrigation or want of knowledge as to when and how to apply the water; although I have received some enquiries as to the possibility of obtaining box shook for packing fruit for local and export purposes.

Notes on Bee Keeping.

By Frederick Sworder, Hallingbury, Hartley.

When bees are able to find an abundance of nourishing food for their requirements in the spring, it is conducive to their early development, consequently they build up very quickly, and where sufficient attention is not given to hives, swarms will be on the wing and may settle in most unaccountable and inconvenient places. Being of an even temperature, it often happens that a swarm may take shelter under the boarded floor of a house.

At first little importance is attached to this circumstance, even though the householder may be of a nervous temperament, but with the approaching midsummer, the number of bees appreciably increases. It is then that the occupier of the house begins t. find them rather objectionable. Even though he may not have a real liking for honey, and would gladly get rid of them, yet he may not know of anyone in his neighbourhood capable of removing them, while through inexperience he feels too nervous to tackle such a risky undertaking.

To anyone placed in such circumstances the operation is not always too difficult, provided the instructions given below are grasped and intelligently carried out, for already novices have accomplished it fairly well.

The number of times my services have been requisitioned to remove swarms of bees that have settled on trees, under floors, in roofs, chimneys, boxes, barrels, railway trucks, and even in a travelling bag, are legion (the majority having been placed in frame hives). I therefore feel confident in giving advice on the subject, hoping that these few hints may be found useful to those unaware how to set about the process.

How to rid the Floor of a House of a Swarm.—Assuming that the householder wishes to clear out a swarm in the shortest time, before commencing operations it is a good plan to blow in some smoke where the bees have entered, and purchase from a chemist a small bottle of Calvert's No. 5 carbolic acid. Remove a floor board, then sprinkle this liquid in close proximity to the bees, not necessarily on them, for this would be a cruel proceeding.

Owing to the powerful nature of the acid, it will not be many minutes before they take their departure, especially if tackled on a warm morning. After they have cleared out, stop up their place of entry, for, failing this, the same trouble will be again experienced. If any combs have been built under the floor, they should be cut away with a sharp knife, the brood combs destroyed, and the honey, which in most cases is good, can be consumed, this being a slight recompense for the trouble taken. Also if a swarm has settled in a cupboard, by adopting the carbolic method similar results will follow.

Transferring Bees from a Floor to a Frame Hive.—When it is required to remove bees from a floor and place them into a frame hive, it will be found to be a more costly operation, for it requires on the part of a novice a certain amount of tact, patience and nerve, with sufficient cash to purchase a frame hive. Should he make up his mind to undertake the work, he should procure a good bee veil of black net sufficiently long to tuck well down into the waistcoat. He will also find it advantageous to take off his coat, being then able to work in greater comfort and with less liability of crushing bees, which have a tendency to crawl up the sleeves. I always adopt this plan in any small or difficult operation, and very seldom wear a veil. In order to subdue bees under any circumstances, a good smoker is essential, for they must be filled with honey before commencing the work on hand. A large sharp knife for cutting the combs from the boards should be used. Procure some narrow white tape to tie a few of the combs into the empty frames supplied with the hive, also a cigarette tin, a small auger, a saw, a hammer, an old chisel or screw-driver and a nail-puller. Have ready some Calvert's No. 5 carbolic acid sprinkled on three or four cloths, and place these under the floor where needed to keep the bees under control, or from clustering at inaccessible places. Should it be seen after removing some of the boards that there is some honey, a basin of water will be found very useful for occasionally washing the hands. Commence work by blowing in several puffs of smoke at the entrance; this is important, as it causes the bees to gorge themselves with honey, thereby greatly tending towards success. If the operator places the palm of the hand where it is considered the swarm is at work, a much warmer temperature will be noticed, thus indicating their exact position under the floor. Do not take up the floor boards directly over the cluster, but commence some little distance behind them, as the main object is to drive all the bees from under the floor and eventually place them in the frame hive. Now use the nail-puller, and then cut the boards so that they may be removed fairly easily. Lever up a number sufficient to give ample room to work. A few more applications of smoke will now be needed, in order to keep the bees quiet.

Having exposed the bees to view, place the frame hive in the room ready to receive the first good comb of honey and brood. Place the roof of the hive sloping up from the floor to the alighting board, making the junction of the two boards flush. Next lay one empty frame on a cloth; cut two tapes about 2 feet in length, and place them about 5 inches apart, so that two ends are under the top bar of this frame while the other two ends are above the bottom bar. Just previous to cutting away any of the combs, always blow the bees away from it, then grasp with the left hand, and with the right hand use the knife, cutting the comb as near to the boards as possible. From any comb that is cut away, brush off the adhering bees into the hive. As the first comb is usually too fragile to transfer, and contains only honey, it can be placed aside for consumption.

Proceed to remove the next comb from the floor, ridding it of bees. Possibly this comb will also contain honey and a little brood, but still too delicate for transferring. Discard this comb also, if thought fit.

The next few combs will be much tougher, containing an abundance of sealed and unsealed brood, also honey, any of which are quite suitable for tying into a few of the empty frames. Cut any good comb to a fair fit; place it in the empty frame, tie the tapes to the top bar, hang the frame with its living contents in the hive and cover it with clothing to prevent chilling. It will be sufficient if only three combs are placed into the hive; the remaining frames should be fitted with worker foundation and wired, as explained in previous notes.

Continue cutting away the combs from the floor until all have been dealt with; those containing brood (young bees in the developing stage) should be removed so soon as possible and buried. The home of the bees is no longer under the floor, but in the hive, and the most interesting work now is to get the bees into it.

With the cigarette tin, or something similar, reach under the floor wherever the bees have clustered. The operator can now gently, but firmly, scrape them towards him, partially or wholly filling the tin with bees, throwing them out on to the sloping board with a sharp jerk, and continuing this work until only a few bees remain under the floor. From one of the tins of bees (if the light is sufficiently good) the queen may be seen to run up into the hive; this is always a source of satisfaction and an assurance that the work has been a success. By sprinkling some carbolic acid under the floor, the return of bees to their old quarters will be prevented.

Now gently carry the hive containing the majority of the bees out of the room, placing it facing the building, and close to their original entrance. Open the windows of the room, then give the former home a good smoking to drive the remaining bees outside. When it is noticed that all have decamped, the old entrance should be effectually stopped up, and the boards can be replaced.

Late in the evening, the hive should be carried and placed on the spot it is to permanently occupy, and in order to prevent the escape of the queen, a narrow strip of excluder zinc should be fastened at the entrance to the hive. The fact of the combs containing honey, brood and queen now being in the hive compels them to accept their new abode, for they seldom forsake a hive where these conditions are present, provided there is a good supply of blooms from which they can collect nectar and pollen; failing these, they must be fed inside the hive with syrup.

Considering that there might be live stock or poultry belonging to neighbours liable to be stung, it would be unwise to commence operations at midday, as the sun is then too powerful; far better is it to wait until about three o'clock in the afternoon, when the temperature is getting cooler.

Transferring Bees from Boxes, etc., into Frame Hives.—When it is desired to remove bees from boxes, do not touch the box until several puffs of smoke have been blown into their entrance, for if the box is touched before smoking, much more difficulty will be experienced in subduing the bees; yet a liberal amount of drumming with the palm of the hand after smoking them tends materially to further subdue them.

After having smoked the bees, I find it a good plan to carry the box a few yards to leeward in the shade; by these means the majority of the old bees will persist in flying to their old spot, and thus for the time being the operator is not bothered with them. This work should be commenced in the afternoon, when no anxiety need be felt that they will fly away or become an inconvenience to neighbours.

Now set the frame hive close to the box of bees with a board sloping up to the entrance; then with a chisel and screwdriver, lever away the side of the box and shake any adhering bees from it into the frame hive or on to the sloping board. Then transfer a few combs of brood and honey as described above. Continue to cut away all the brood combs from the box, burying those not required. With a cigarette tin, scrape the bees from the box and throw them from it on to the alighting board of the hive until the majority have been removed. A few drops of carbolic acid sprinkled inside the box will also hasten operations. The old box should now be taken some distance away, or broken up.

At sundown, when all the flying bees have entered the frame hive, it should be carried to its permanent position, a narrow strip of excluder zinc being fastened at the entrance. To ascertain what progress has been made, the hive may be opened after a period of about ten days, and if it is seen that some of the combs contain eggs, unsealed brood and honey, the strip of excluder zinc may be removed. Into any hive additional frames fitted with worker foundation should be inserted as required.

Refrigerated Produce from New Zealand.

The statistics of refrigerated produce exported from New Zealand for the calendar year 1914 make a big shewing. Frozen meat shipments totalled 3,199,266 cwt., valued at £5,863,062. In this aggregate mutton accounts for 1,332,848 cwt. and £2,115,080; lamb, 1,149,385 cwt. and £2,554,517; mutton and lamb joints, 20,661 cwt. and £33,730; and beef, 613,022 cwt. and £1,029,529. Compared with the previous year, frozen meat as a whole shews an increase of 25 per cent. in weight and 32 per cent. in value. Taking individual lines, mutton has an increase of 23.5 per cent., lamb 6 per cent., and beef nearly 130 per cent. in quantity. The North Island contributed 75 per cent. of the mutton, 40 per cent. of the lamb, and 90 per cent. of the beef exports. The year under review, by the way, is the first in which the New Zealand beef export has reached the million sterling mark.

The dairy produce export for 1914 aggregated 1,298,845 cwt., valued at £4,902,701. These figures represent 434,067 cwt. and £2,378,576 for butter, and 863,776 cwt. and £2,564,125 for cheese. As compared with 1913, dairy produce is up 32 per cent. in quantity and 28.22 per cent. in value. Taking the two branches separately, butter increased 16.60 per cent. in quantity and 13.43 per cent. in value, while cheese put on increases of 41.20 per cent. and 44.84 per cent. respectively. In dealing with the export statistics of refrigerated produce for the years 1914 and 1913, it should be borne in mind that the big waterside strike somewhat restricted shipments at the end of the latter year; while, on the other hand, the war abnormally stimulated the meat output, and prices generally, in 1914. Making all allowances, however, the figures for the latter year mark substantial progress in the refrigerating industries.—*Ice and Cold Storage Review.*

World's Champion Butter Producer.

A Guernsey cow is responsible for another record performance in the way of butter production. It is significant that the previous record had also been held by one of that breed —namely, May Rilma (22761).

The present world's champion, Murne Cowan, is a ten-year-old cow, having been born in May, 1905. She dropped her last calf on 1st February, 1914, and then commenced her testing period, with the result that she has given 24,008 lbs. of milk, producing equal to 1,098 lbs. of butter fat (approximately 1,307 lbs. commercial butter). Her performance, month by month, is as follows :—

1914.	Milk, lbs.	Test, per cent.	Butter fat, lbs.
February	611.00	4.59	28.04 (9 days)
March	2,281.30	4.31	98.32
April	2,361.50	4.32	102.02
May	2,305.90	4.03	92.93
June	2,210.80	4.10	90.64
July	2,089.70	4.38	91.53
August	1,934.50	4.44	85.89
September	1,841.50	4.66	85.81
October	1,733.20	4.80	83.19
November	1,834.60	4.99	91.55
December	1,884.40	5.10	96.10
1915.			
January	1,871.30	5.28	98.80
February	1,048.30	5.09	53.36 (19 days)
Total	24,008.00	4.574 (average)	1,098.18

The figures will help to shew what an extraordinary producer this cow is, as, for the last nineteen days of the test, she gave over 53 lbs. of butter fat. Murne Cowan is in calf, having been bred to on the 1st August, 1914, so that she was over six months in calf when the test was completed. As a six-year-old this cow had already shewn a record of 845 lbs. of butter fat, and her daughter, Sweet Maria, has shewn as a three-year-old 682 lbs. of butter fat. This cow is related to the one-time noted cow, Dolly Dimple, which as a three-year-old gave 906 lbs. of butter fat.

The champion is rather a plain-headed cow, but has a wonderful constitution and an excellent bag. The dairy wedge shape is of course evident, and her thighs are very thin and flat. She was bred by Mr. A. F. Peairs, of Elizabeth, Pa., U.S.A., and is owned by Mr. O. C. Barber, of Akron, Ohio.—M. A. O'CALLAGHAN.—(*Agricultural Gazette of New South Wales.*)

Wanted.

The following numbers and indices of the *Rhodesia Agricultural Journal* are out of print, and have been enquired for by a reader, who is willing to pay 5s. each for them :—

Vol. I.—Nos. 5 and 6, plus index.
Vol. V.—Index.

In addition to the above, the following have been enquired for :—

Vol. I.—Nos. 2 and 6.
Vol. II.—Nos. 1 to 3.
Vol. III.—No. 1.
Vol. IV.—Nos. 1 and 4.
Vol. V.—No. 2.
Vol. X.—No. 2.
Indices to Vols. I., II., III. and V.

If any readers have any of these *Journals* and indices in their possession, and do not require them, we shall be very pleased if they will kindly send same to the Editor. If it is desired, they can be exchanged with any they may have missing, if available.

Oil Factory.

The following circular, dated 24th July, 1915, has been issued by the Acting Commercial Representative of the British South Africa Co. :—

With reference to my circular letter of the 19th April last, I have to inform you that the Beira and Mashonaland and Rhodesia Railways have agreed to convey ground nuts (unshelled), castor beans, sunflower seed, cotton seed and linseed from all sections to Salisbury, when consigned to the Oil Factory in full truck loads at owners' risk, station to station, at the undermentioned special rates :—

From any station between Broken Hill, Umtali and Plumtree (all inclusive) to Salisbury, at rates ranging from 2d. per ton per mile (minimum 2s. 6d. per ton) to 1½d. per ton per mile, subject to a maximum charge of £2 10s. per ton.

Smaller quantities than full truck loads are carried at ordinary rates, according to classification, unless charging at full truck loads at the special rate amounts to less, when the latter will apply. The following is the classification of consignments sent in less than full truck loads :—

Ground nuts (unshelled), castor beans, sunflower seed, cotton seed and linseed :—

1. Umtali-Salisbury, including Lomagundi and Mazoe branches. Rate 3 E, minimum 50 lbs.
2. Salisbury-Broken Hill, including Blinkwater and West Nicholson branches, and from Plumtree. Rate 4, minimum 50 lbs.

Delivery Charges.—When consignments are received in full truck loads, they will be conveyed from Salisbury Station to the Oil Factory over the Bacon Factory siding at the undermentioned rate :—

One shilling per ton, subject to a minimum of 10s. (ten shillings) per engine trip. Consignments of less than full truck loads are delivered to the Oil Factory by wagon from Salisbury Station at cartage rates, unless the charge for sending the truck to the factory siding as quoted above amounts to less.

Further information regarding freights may be obtained from the Railway Company's officials at all stations.

Empty Sacks.—The question of the return of empty sacks has been considered and arrangements have now been made for all surplus sacks to be returned. A certain percentage of the sacks are required by the factory, but when a surplus accumulates, such surplus will be returned to farmers from whom oil seeds have been purchased, and the distribution will be made on a *pro rata* basis. The factory cannot undertake to return to each individual farmer the actual sacks in which his oil seeds were sent.

Sunflower Seeds.—The black variety of sunflower seed contains a larger percentage of oil than the other varieties, and it is therefore more suited to the factory's requirements, but as a number of farmers have grown sunflower seed other than the black variety, the factory is prepared to purchase all varieties of this season's crop at the price quoted, *i.e.*, ¾d. per lb.

A limited supply of the black variety of sunflower seed is available and can be supplied to farmers for the next planting season. Application for seed should be made to the Manager of the factory.

Oil Cake.—The factory is prepared to supply oil cake at £10 per ton f.o.r. Salisbury Station. Orders should be addressed to the Manager, B.S.A. Co.'s Oil Factory, Salisbury.

The other products of the factory can now be purchased at the various stores.

Veterinary Report.

April, 1915.

AFRICAN COAST FEVER.

SALISBURY DISTRICT.—On 12th April a fresh outbreak occurred on the farm Helenvale in a herd of 43 head. Two animals had died the previous night, and several were shewing symptoms of advanced Coast Fever. As there appeared to be little hope of saving even a small number, and to reduce the danger of the disease spreading to the adjoining farms, it was decided to destroy the diseased animals and slaughter the remainder, leaving three cows stabled for the domestic milk supply. On the 27th the disease was discovered on the adjoining farm Glen Lorne in a herd of 230 head. One animal was found affected and destroyed.

There were no deaths at any of the other of the infected centres.

MELSETTER DISTRICT.—Four fresh outbreaks occurred, viz., on the farms Inhoek, Landsdown, Randfontein and Wolvedraai, involving a total of 251 head of cattle. In each case the infection was gross, and a heavy mortality must be expected.

GLANDERS.

The following animals were tested with mallein on importation and found healthy :—Bulawayo, 17 horses and 19 donkeys. Umtali, 1 mule.

HORSESICKNESS.

The mortality shews a considerable falling off compared with the months of February and March.

EPHEMERAL FEVER.

A few cases with no mortality were reported.

SARCOSPORIDIOSIS.

Sarcospores were met with in heart scrapings from slaughter oxen at Macheke, Umvuma, Bulawayo and Salisbury.

TRYPANOSOMIASIS.

This affection caused considerable mortality amongst cattle in the Hartley and Gatooma districts.

IMPORTATIONS.

Horses, 17; mules, 1; donkeys, 19; heifers, 116 (2 *ex* United Kingdom); bulls, 22 (5 *ex* United Kingdom); sheep and goats, 3,861.

May, 1915.

AFRICAN COAST FEVER.

Salisbury District.—Two fresh outbreaks occurred, viz., at Borrowdale Estate and the farm Sternblick. At the former, 341 head of cattle were involved and approximately 55 deaths occurred. At the latter farm, 89 head were involved, and the mortality was 3 head. The only other previously infected centre at which any deaths occurred was Glen Lorne, where 7 head were destroyed.

Mazoe District.—An outbreak occurred on the Belford Estate amongst a herd of cattle brought from Mtoko district in April. This herd travelled *via* Borrowdale Estate, and undoubtedly contracted the infection there. Mortality, 3 head.

Melsetter District.—Fresh outbreaks occurred on the farms Landsdown, Houtberg, Heilrand and Highlands. The total number of cattle involved was 380.

GLANDERS.

The following animals were tested on importation and found healthy :—Horses, 187 ; mules, 64 ; donkeys, 69.

HORSESICKNESS.

A slight mortality from this disease was reported.

IMPORTATIONS.

Horses, 187 ; mules, 64 ; donkeys, 69 ; heifers, 321 (3 *ex* United Kingdom) ; bulls, 69 (5 *ex* United Kingdom) ; sheep and goats, 3,316 ; pig, 1

June, 1915.

AFRICAN COAST FEVER.

Salisbury District.—A fresh outbreak occurred on the farm Carrickcreagh, adjoining the previously infected centres of Helenvale, Borrowdale and Glen Lorne. One death occurred. At Borrowdale 6 animals succumbed, bringing the total mortality up to 61.

MAZOE DISTRICT.—No fresh cases amongst the infected herd on Belford Estate.

MELSETTER DISTRICT.—Four fresh outbreaks occurred during the month, viz., on the farms Woodstock, Ravenswood, Joppa and on Kenilworth amongst a herd of native cattle. Total number involved, 214 head. The following shews the infected farms in the district and mortality to date :—

	Original No. of cattle.	Mortality.
Springfield	209	2
Nooitgedacht (2 herds)	115	79
Avontuur	47	11
Clearwater	235	110
Inhoek and Woodstock	114	39
Landsdown (3 herds)	131	58
Randfontein (2 herds)	84	61
Wolvedraai (native herd)	26	23
Heilrand	176	20
Houtberg	79	6
Joppa	86	1
Highlands (3 herds)	94	52
Ravenswood	57	3
Kenilworth (native)	62	1

Where possible, the infected herds have been removed to clean veld through temperature camps and dipped or sprayed regularly. In some cases no clean veld was available; the animals had, therefore, to remain on infected veld, and are being dipped or sprayed every third day. In several cases, *e.g.*, Springvale, Clearwater, Heilrand, Houtberg, Joppa and Kenilworth, it is believed that the herds have been freed from infection. At Wolvedraai, the 3 head remaining were slaughtered for food.

GLANDERS.

The following animals were tested with mallein on importation and found healthy :—Horses, 103; mules, 18; donkeys, 55.

TRYPANOSOMIASIS.

Several deaths amongst cattle reported from the Hartley district. In the Melsetter district, a number of animals have died from this disease at three centres on or adjacent to the border of Portuguese territory. This disease has not been previously recorded in the Melsetter district. Tsetse fly is plentiful a short distance across the border, and it is thought that these cases are the result of extension of the fly areas up the valleys in consequence of the heavy rains last season, but so far no tsetse flies have actually been seen on the Rhodesian side of the border.

IMPORTATIONS.

Horses, 103; mules, 18; donkeys, 55; heifers, 447 (11 *ex* United Kingdom); bulls, 96 (20 *ex* United Kingdom); sheep and goats, 3,378.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Farming Calendar.

August.

BEE KEEPING.

Warmer weather having set in, hives can now be safely opened and examined as to their condition. In most cases it will be found that queens have again commenced to lay. Where this is noticed, still further encouragement can be given by crushing with a knife blade the cappings of the sealed honey yet remaining in the upper portion of the brood combs. Bees should now be busy distributing and collecting the pollen from the fruit bloom. This operation is beneficial both to the horticulturist and bees. Strong prevailing south-easterly winds will be prevalent this month, therefore assist your bees in entering their hives by protecting the entrances.

CITRUS FRUITS.

Orange trees should already have been pruned, and are now ready for the first irrigation. The first growth should be commencing early in the month, and by this time the trees should already have had one good soaking. As soon as the trees have set their fruit they should never be allowed to stop growing through lack of moisture, otherwise the fruit is liable to be poor in quantity and lacking in quality. After irrigation, cultivation should follow, and the earth round the trees be loosened with a spade. If fertiliser is to be used, it should be applied after the first irrigation, so as to be thoroughly incorporated with the soil in the cultivation following.

CROPS.

Provided there are no heavy frosts, dhal may be allowed to remain until August before harvesting. As a second or third year crop, dhal can always be cut earlier, say towards the end of June or in July. Castor beans should be harvested as the pods ripen, which they continue to do for a considerable period. Ploughing should be undertaken continuously wherever possible; the value of early ploughing cannot be over-estimated. Ploughing should be followed as soon as possible by harrowing. Mangels can be pulled and fed as required. The ensilage pit can now be opened, and the contents fed. Seed potatoes should be worked over, and decayed tubers removed.

Crops under irrigation will require but little attention. In oat crops, where the seed has been obtained from the Union, care should be taken to weed out any Drabak or Darnel (*Lolium temulentum*) that may be growing among the crop, as this weed is poisonous. Care should also be taken not to over-irrigate any of the lands.

ENTOMOLOGICAL.

Potato.—Early planted crops of potatoes may be attacked by caterpillars. The crops should be sprayed immediately with an arsenical wash.

Cabbage Family. Young plants of this family should be kept sprayed with an arsenical wash to check attack by webworm. Do not spray plants of which the foliage is eaten within three weeks of use.

Onion.—May still be troubled with thrip. Use tobacco wash or paraffin emulsion.

Deciduous Fruits.—Any trees infested with scale may be sprayed with a winter wash during August. Lime sulphur salt wash or scalecide is recommended.

Guava.—Collect and destroy remnants of late crops to keep down citrus codling, especially if trees are in vicinity of citrus orchards.

FLOWER GARDEN.

August.—This is a busy month, and the soil should be kept in good tilth. Roses, shrubs and ornamental trees may be planted. All seeds may now be sown. Marguerite carnations sown now will flower by the end of the year. Cuttings of carnations and other perennials should be planted either in the open ground or in boxes, using loose and well-decomposed soil for the latter, taking care that they are well drained, or the success will be small.

FORESTRY.

Sow seeds in nursery beds of quick-growing species, such as gums. Plant out poplars and other deciduous trees. Prepare soil for filling tins for young plants.

GENERAL.

Fireguards should be completed and every precaution taken to guard against loss of grazing from fires. Natives commence ploughing their softer land this month, and for this reason, as well as because beer is plentiful at the kraals, local labour is apt to be scarce. At this time of the year, however, the need for boys on farms is not so severely felt as later on.

POULTRY.

Keep the young stock growing, and give plenty of ventilation to their sleeping quarters as the nights grow warmer. A good supply of green food and a small quantity of powdered charcoal in the soft food will keep them healthy. Do not hatch more chicks than you can safely house and attend to when they mature.

STOCK.

Cattle.—On the early granite and sand veld probably the worst of winter is over so far as grazing is concerned, and a nice bite of green grass is appearing. Care should be taken where cattle are allowed to graze on the early burnt grass not to let them get too much at first. On diorite farms the haystack will still be required, and in all cases a certain amount of hay or ensilage should be held in reserve against the possibility of very late rains. The bulls may again be put back into the herds. Any very young calves should be kept near home, and dipping should be carefully attended to. In dairy herds on any soil whatever, feeding, housing and bedding cannot be relaxed. Cows in full milk will benefit by a ration of, say, 5 lbs. of maize (crushed and soaked), 30 lbs. to 40 lbs. of ensilage or pumpkin and 8 or 10 lbs. of hay. If it is possible to give, in addition to the above daily ration, 2 lbs. of peanuts, crushed with the shell, or linseed ground with maize, or peanut cake, a very great benefit will be derived. Calves, especially young ones, must be carefully watched; they should not run too far, and are better inside, except when the weather is warm. A little sweet hay, bean meal, linseed, peanuts or peanut cake and a small ration of green food will pay to feed to them.

Sheep.—Sheep should give little trouble at this time of the year, but on very dry veld a handful of mealies and a little hay or ensilage will materially assist ewes with young lambs.

VEGETABLE GARDEN.

All vegetable seeds may now be planted. Those having but a limited supply of water would be wise to sow in boxes, transplanting when large enough. The seed beds require careful preparation; they should be well raked up and laid out in long narrow rows in order to facilitate watering. The tops of the beds should be levelled as near as possible, and when sown, covered over with a thin layer of straw or grass, which will prevent the seeds being washed out when watering and the soil from caking.

VETERINARY.

Redwater and gallsickness occur all the year round, although these diseases are more prevalent during the summer months. A good many deaths occur this month, however, amongst imported stock. Vegetable poisoning will probably be in evidence. Sheep can be inoculated against blue tongue. Scab is a poverty winter disease.

WEATHER.

No rain is to be expected, and even on our eastern mountains the precipitation is trifling. Showers, however, do occasionally fall in places, but are of no consequence. The sun is often warm during the day, but the nights are apt to be cold, and grazing being scarce, food and shelter are necessary for the stock.

September.

BEE KEEPING.

Many trees in the bush will now be blooming. This feature will greatly assist in the building up of weak stocks. Strong colonies should be gathering some surplus honey, and in order to prevent swarming, it may be found necessary to give them a crate of sections or shallow frames, preferably fitted with full sheets of super-foundation. In some districts one crate may not have the effect of preventing the early preparation to swarm. Should it then seem desirable, put on another one, and open the entrances to full width. Should a swarm be secured, do not omit to remove from one of the established stocks a frame containing unsealed brood and honey; first shake off the bees adhering to this comb on to their own alighting board, then insert it into the middle of the newly hived swarm. In most cases the swarm will settle down to work at once, for bees seldom forsake unsealed brood. As a further precaution against decamping, fasten at the entrance a narrow strip of excluder zinc; this will prevent the escape of the queen. All swarms must be fed with syrup, preferably inside the hive.

CITRUS FRUITS.

If the trees were irrigated early in August, the next application of water should be given about the first or second week of this month. After irrigation, cultivation should follow. Constant attention should be given to young trees, and a watch kept for any adventitious shoots or suckers, which should be cut away at once. This should be attended to right through the growing season.

CROPS.—See August.

ENTOMOLOGICAL.

Tobacco.—Young plants in seed beds may suffer from cutworms. See handbook of Tobacco Culture, published by Agricultural Department, pp. 71-90.

Potato.—Early potatoes are liable to suffer from caterpillars. The crop should be sprayed at first sign of injury with an arsenical wash.

Cabbage.—During this month the most prominent enemies of plants of this family are diamond back moth and webworm. Cabbage louse is sometimes troublesome. The young plants may be sprayed or dusted with an arsenical compound for the former, and sprayed with tobacco wash and soap for the latter.

Beans planted under irrigation during September usually escape serious infestation with stem maggot.

Citrus Trees.—Scale insects commence to increase rapidly with the advent of warmer weather, but the trees should not be sprayed or fumigated while in blossom.

FLOWER GARDEN.

Although our spring advances with this month, rains are very uncertain and usually scarce, but in spite of circumstances plants now grow with very little encouragement. Perennials and shrubs should be well attended to, especially those which flower early; the soil should be kept well stirred around the stems, and they should be watered if necessary.

Practically all flower seeds may now be sown in boxes, nursery beds, or in the open ground where they are to be grown. Nursery beds are perhaps preferable, as a great deal of watering may have to be resorted to on account of late rains. All annuals sown in July should now be ready for transplanting; should these be few, and a larger show of flowers desired, the heads may be pinched out after planting, which makes the plant spread out more and become bushy. Shrub and ornamental tree seeds should be sown now if desired for planting out during the rainy season, and may be sown in the open; if it is desired to hasten them they should be planted in boxes and covered with glass, and placed in a sunny position sheltered from the winds. If summer bulbs have not already been replanted, this should be done at once; they sprout as the weather becomes warmer, and, if allowed to do this before planting, the bulb loses much of its vigour. It must be borne in mind that all bulbs that cluster, if divided, produce better blooms, and the plants have a better appearance than the old cluster, which has a lot of decayed matter and generally a ragged appearance; this also applies to those perennials which may be increased by division of roots.

FORESTRY.

Sow in nursery beds any seeds that were left over from last month. Where wattles are grown for bark, stripping can be commenced this month. Prepare soil for filling tins. Any young trees that are large enough should be pricked out into tins.

GENERAL.

Indigenous labour is apt to become more scarce at this time of year. the boys returning to their kraals to break up the land for next season. Stock are liable to stray in search of the young grass now coming up, and much trouble from this cause is to be looked for on unfenced farms. Natives are now cultivating their gardens preparatory to sowing their crops, which they do much earlier than do Europeans. The mischief caused by veld burning becomes apparent from this time onwards in the condition of the stock, and it is necessary frequently to move them away in search of grazing.

POULTRY.

Thoroughly overhaul all the houses before the rains. Do not wait for the first shower to indicate where the leaks are. Early hatched cockerels should be separated from the pullets by now.

STOCK.

Cattle.—Ranching cattle should require little now in a normal season; it is only in the event of very late rains that trouble should be expected. Where possible, it will be wise to keep an eye on those cows that may be expected to calve early, with a view to feeding them if necessary, and seeing that they do not get too poor. The dairyman will carry on much as in August; he will, however, use his discretion (in accordance with the condition of his veld) as to the use of ensilage, pumpkins or other bulky and succulent food. He will be wise not to shorten the supply of concentrated foods for some time to come. A little hay or ensilage should still be kept in reserve until the rains have fallen in reasonable abundance.

Sheep.—The remarks for August apply. If spring lambs are expected, it will be wise to see that the sheep shed is in good order- clean, dry, properly drained and airy. Watch that the ewes shall not be poor when they lamb, and remember that they cannot rear good lambs if the veld is bad, but must have their grazing supplemented, just as milk cows are fed in order to produce milk.

TOBACCO.

Begin sowing seed beds each week for the acreage proposed to be planted; fertilise and push them so as to be ready for planting out should rain come early in November.

VEGETABLE GARDEN.

Most seeds may now be sown, though there is risk of losses from want of rain. Watering, of course, can be resorted to. Marrows, pumpkin, melon, cucumber and peas may be planted in the field after the first rains. Tomatoes that have been sown earlier should be planted out, and these as they come on should be staked.

VETERINARY.

There should be very few deaths from redwater and gallsickness this month. Cases of vegetable poisoning of stock picking up tempting young green shoots of dangerous character on the burnt veld are of frequent occurrence. Sheep can be inoculated against blue tongue, but ewes in lamb should not be treated, on account of the danger of abortion. Scab may be prevalent.

WEATHER.

The temperature may be expected to rise steadily during this month. Rains are not due until next month, though the average over a period of years shews slightly more than in the previous four months, and ranges between .1 and .5 inch. Frost has been known to occur in September, although this is a very unusual event. Rain-gauges should be seen to before the rains commence. They should be carefully adjusted to stand exactly level with the lip four feet above ground, and care should be taken that no tree, building or other obstruction interferes with the fair precipitation of rain into the orifice.

Market Reports.

The produce market in Salisbury is well supplied with all lines except potatoes and onions, which are very scarce. Maize is coming forward in large quantities. Butter and eggs are now plentiful. There is no demand for cattle in Salisbury and district. Donkeys are unsaleable.

Messrs. Boggie & Co. held their regular quarterly cattle sale at Gwelo on Wednesday, 2nd June. The sale was limited to about 500 head of horned cattle. The sale was remarkable for the sudden rise in prices all round; in many cases the animals fetched similar prices to those in vogue twelve months ago. It was generally estimated that there was a rise of 25 per cent. over prices realised at a sale held the previous month. Trek oxen fetched from £6 to £8 10s.; young untrained oxen averaged about £2 15s.; slaughter stock from 40s. to 50s. per 100 lbs. for prime animals; native stock about 30s. per 100 lbs.; heifers, half-bred and Mashona, from £4 to £5 10s.; colonial cows in calf or with young calves at foot averaged about £9 10s.; goats, 9s. 6d.; fowls, 3s. 6d. to 4s. 6d. There was no demand for mules or donkeys. Enquiries were made for buck wagons, but there was none on the sale. There were several Cape and other carts for sale, but there was no demand. The sale was considered the most successful held during the year, all owners being very pleased with the prices realised.

At Messrs. Barry & English's sale at Odzi on the 12th June, the following prices were realised:—Heifers, £7 10s. to £8 15s.; cows, £8 10s. to £10 10s.; oxen, £6 10s. to £8 10s.

Messrs. Whitfield & Co. held a sale at Banket Junction on the 21st July on behalf of Mr. G. Campbell, some 400 head being sold. The prices realised were:—German East African cows, £4 to £5; native heifers, from £3 10s. to £5 17s. 6d.; young bullocks, from £5 5s. to £6 2s. 6d.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs. -	10/7 12/9	—	—	25/0
Beans, 203 lbs. -	15/0 33/6	20/0 22/0	27/6 32/6	25/0
Boer Meal, unsifted, 200 lbs. - -	—	—	46/0 47/0	50/0
Bran, wheaten, 100 lbs.	8/0 8/3	—	12/0 13/0	15/0
Flour, 100 lbs. -	—	—	—	26/0 27/0
,, Colonial, 100 lbs.	—	—	26/0 27/0	27/6 30/0
Forage, 100 lbs. -	6/0 8/0	—	10/0 11/0	10/6 11/0
,, Colonial Oat -	—	—	—	—
Hay - -	Bale. 6d.	—	40/0 50/0	45/0 50/0
Kaffir Corn, 200 lbs. -	7/0 8/0	8/6	13/6 15/0	9/0 10/0
Manna, 100 lbs. -	4/0 4/9	—	—	—
Mealies, S.A. White, 203 lbs. - -	7/9 8/4	8/6 9/6	11/0 12/0	8/0
Mealies, Yellow, 203 lbs.	8/6 9/0	9/0 10/3	10/6 11/6	—
Mealie Meal, White, 183 lbs. - -	—	—	11/6 12/6	8/6 9/0
Munga, 200 lbs. -	—	—	10/0	11/0 12/0
Monkey Nuts, bag, 83 lbs.	—	11/6	8/6 9/6	7/0 8/0
Oats, 150 lbs. -	—	—	22/6	25/0 27/6
Onions, 120 lbs. -	15/9	20/0 24/0	22/6 31/0	35/0
Peas, 200 lbs. -	16/6 22/0	—	—	—
Potatoes, new, 150 lbs. -	11/0 14/6	7/0 16/6	17/6 19/0	17/6 20/0
,, old, 150 lbs. -	5/0 10/6	—	—	—
Rapoko - -	—	—	9/0	7/6
Rye, 200 lbs. - -	15/0 16/9	—	—	—
Salt, 200 lbs. - -	—	—	10/0 11/0	11/6 12/0
Wheat, 203 lbs. -	31/6	—	—	30/0
Butter, local, per lb. -	1/5 1/7	1/6 1/10	—	2/0
Eggs, local, per dozen -	1/4 1/6	1/3 1/9	2/6	2/0 2/6
Ducks, each - -	2/6 3/10	2/6 3/4	—	3/6 5/0
Fowls, each - -	1/9 3/3	1/4 2/6	—	2/6 4/6
Geese, each - -	3/6 4/6	—	—	7/6 11/0
Turkeys, cocks, each -	4/6 12/3	4/6 12/0	—	12/6 17/6

LIVE STOCK.

Slaughter Cattle, 100 lbs.	30/0 35/0	—	27/6 35/0	30/0 35/0
Trek Oxen, trained -	£7 £7/10	—	£6 £10	£7 £10
Local Cows, milk -	—	—	£7 £17	—
Dairy Cows - -	£16 £30	—	£20 £30	£20 £25
Native Cows - -	—	—	—	£5 £7
Heifers, Colonial -	£4 £7	—	£7 £17/10	£7 £8
,, Native -	—	—	—	£4 £6/10
Pigs, live weight -	3½d. 5¼d.	—	—	4d. 4¼d.
Horses, riding, salted -	—	—	—	—
,, ,, unsalted	—	—	£12 £30	£25 £30
Mules, inoculated -	£10 £25	—	£25 £35	£25 £30
Donkeys, geldings -	£3 £4/10	—	£3/10 £6	£4 £6
,, mares -	—	—	£5 £7/10	£5 £7
Goats - -	—	—	8/6 15/0	12/6 15/0
Persian Ewes -	—	—	—	20/0 22/6
Cross-bred Ewes -	—	—	—	17/6 20/0
Sheep, slaughter -	13/0 14/0	—	13/0 22/0	22/6 25/0

Weather Bureau.

TEMPERATURES.

Station	May		June	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MASHONALAND—				
Hartley—				
Gatooma	80·3	—	73·4	—
Giant Mine	—		—	—
Hallingbury Farm	71·7	46·1	69·3	45·0
Lomagundi—				
Clydesdale	—	—	—	—
Eldorado Mine	76·7	47·2	74·0	42·4
Kanyemba	88·3	—	—	—
Sinoia	81·6	46·3	78·7	45·4
Sipolilo	80·9	50·3	77·0	46·6
Makoni—				
River Junction Farm ...	—	—	—	—
Rupurara	67·8	42·3	65·6	38·0
Mazoe—				
Melfort Farm Estate ...	—	—	—	—
Shamva Mine	77·4	51·4	—	—
Melsetter—				
Melsetter	65·0	—	67·2	—
Mount Selinda	—	—	—	—
Vermont	—	—	70·6	48·9
Salisbury—				
Chishawasha	73·7	47·7	72·5	44·5
Glenara	—	—	—	—
Salisbury (Gaol)	74·8	46·2	72·0	44·4
„ Agric. Dept. Offices	72·9	44·8	70·27	42·77
Umtali—				
Chiconga's Location ...	74·8	48·6	71·6	44·6
Public School	77·2	50·8	—	-
Summerfield	65·1	52·0	61·6	49·6
Victoria—				
Eythorne	77·6	45 9	64·4	31·01
Victoria	72·0	47·7	69·8	41·4
MATABELELAND—				
Bubi—				
Leighton Farm	—	—	—	—
Bulalima—				
Plumtree	—	—	—	—
Tegwani	77·6	52·1	53·7	45·1
Bulawayo—				
Essexvale	75·9	45·3		
Hope Fountain	—			
Observatory	71·2	48·6	—	—
Rhodes Matopo Park ...	73·8	45·9	72·1	41·5
Gwanda—				
Antelope Mine	74·7	55·4		—
Gwelo—				
Gwelo (Gaol)	72·26		73·8	
Hagley (Iron Mine Hill) ...	78·6	48·4		

TEMPERATURES—*(Continued)*.

Station	May		June	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—(Continued)				
Mangwe—				
Empandeni	76·0	—	75·0	—
Tuli—				
Mazunga	81·0	50·0	79·6	44·6
Tuli	79·6	50·1	78·5	45·6
Wankie—				
Guyo	—	—	—	—
The Hospital	84·8	56·5	—	—
Victoria Falls	80·94	43·9	76·1	36·3

RAINFALL.

Station	May	June
MASHONALAND :		
Charter—		
Buhera	0·10	—
Driefontein	0·18	Nil
Enkeldoorn	—	,,
Grootfontein	—	—
Induna Farm	—	—
Marshbrook	0·25	Nil
Riversdale	Nil	,,
Spitzkop	,,	,,
The Range	—	—
Umvuma (Railway)	1·80	—
Hartley—		
Ardgowan	0·04	—
Auchter Leny	0·02	Nil
Battlefields (Railway)	Nil	—
Beatrice Mine	—	—
Carnock Farm	0·23	Nil
Clifton Farm	—	—
Elephant Hill, Battlefields	—	—
Elvington	0·62	Nil
Franceys	Nil	,,
Gadzema	,,	,,
Gatooma (Railway)	,,	,,
Gatooma	0·06	,,
Giant Mine	Nil	—
Gowerlands	,,	Nil
Hallingbury	,,	,,
Hartley (Railway)	,,	—
Hartley (Gaol)	—	—
"Jenkinstown"	Nil	—
Makwiro	,,	0·02
M'pofha Farm	—	—

RAINFALL—*(Continued).*

Station	May	June
Mashonaland—(Continued)		
Hartley—continued		
Shagari	0·43	Nil
"Stoneygate"	0·38	..
Lomagundi—		
Banket Junction (Railway)	Nil	Nil
Clydesdale	—	—
Darwendale	0·32	0·01
Duxbury Farm	0·02	Nil
Eldorado	Nil	
Eldorado Mine	0·04	—
Golden Kopje Mine	0·09	—
Kanyemba	Nil	—
Lone Cow Estate	—	
Longmead	0·01	
Palm Tree Farm	Nil	Nil
Sinoia	0·04	..
Sipolilo	Nil	,,
Umvukwe Ranche	—	—
Makoni—		
Chimbi Source	Nil	0·11
Eagle's Nest	0·03	0·06
Ellavale	3·48	—
Inyanga	0·15	0·55
Inyazura	0·35	0·18
Mona	—	
Monte Cassino Mission	0·18	Nil
Odzi (Railway)	0·46	..
River Junction	—	—
Rusape (Railway)	Nil	—
Rusape	—	—
Rupurara	Nil	—
Springs	,,	0·11
St. Trias' Hill	0·22	—
York Farm	—	—
Mangwendi—		
Bonongwe...	0·27	0·07
Glen Somerset	0·79	Nil
Huish Estate	0·68	0·09
Land Settlement Farm	0·16	
Macheke (Railway)	1·70	Nil
Marandellas	—	—
Marandellas (Railway)	0·77	—
Mrewa	0·45	
Mtoko	0·05	0·01
Mungo	—	—
Selous Nek	Nil	Nil
Theydon	0·08	0·06
Tweedjan	Nil	Nil

RAINFALL—(*Continued*).

Station	May	June
MASHONALAND—(Continued)		
Mazoe—		
Avonduur	—	—
Bindura (Railway)	Nil	—
Bindura	1·10	Nil
Ceres	0·43	—
Chipoli	Nil	Nil
Claverhill	0·46	,,
Darwin	Nil	0·03
Dunmaglas	—	—
Fairview	—	—
Jumbo	Nil	—
Kilmer	0·05	Nil
Laguaha	0·02	,,
Lowdale	—	—
Mazoe	Nil	Nil
Melfort Estate	—	—
Omeath	Nil	Nil
Ruia	,,	—
Ruoko	—	—
Shamva	Nil	Nil
,, Mine	0·10	—
Sleamish	Nil	Nil
Stanley Kop	0·04	,,
Sunnyside	Nil	,,
Teign	,,	—
Umvukwe Flats	—	—
Waterfall Farm	—	—
Melsetter—		
Chikore	0·76	0·51
Chipinga	1·20	
Helvetia	1·01	0·28
Melsetter	1·59	0·34
Mount Selinda	2·17	—
Mutambara Mission	0·12	0·53
Pasture	0·84	Nil
Tom's Hope	0·63	0·24
Vermont	2·34	0·67
Salisbury—		
Avondale	0·15	Nil
Botanical Experiment Station	Nil	—
Brookmead	—	—
Chishawasha	0·08	Nil
Cleveland Reservoir	0·12	,,
Forest Nursery	—	—
Glenara	—	—
Goromonzi	Nil	—
Gwebi	0·08	Nil
Hillside	0·06	—
Lilfordia	0·20	—
Salisbury (Agricultural Department)	0·11	—

RAINFALL *(Continued).*

Station	May	June
MASHONALAND—(Continued)		
Salisbury—continued		
Salisbury (Club)	—	—
,, (Gaol)	0·18	Nil
,, (Railway)	Nil	,,
Sebastopol	0·13	,,
Selby	Nil	,,
Stapleford	—	—
The Meadows	—	—
Westridge	0·06	Nil
Umtali—		
Chiconga's Location	0·23	0·06
Odzani	0·30	0·69
Odzi	—	—
Penhalonga	1·64	1·70
Premier Estate	Nil	0·10
Public School	0·17	—
Stralsrund...	0·16	—
Summerfield	0·31	0·42
Umtali (Railway)	0·19	—
Utopia	0·50	0·22
Victoria—		
Chibi	0·36	Nil
Chilimanzi	0·28	,,
Chingombe	0·05	—
Chiredzi Ranche, Ndanga	0·43	—
Clipsham	0·43	0·25
Elephant Hill	—	—
Empress Mine	0·52	Nil
Eythorne	0·41	0·15
Fairburn	0·09	0·03
Fort Victoria	0·40	0·11
Gokomere	0·18	0·08
Gutu	0·11	Nil
Hanyanya (Bikita)	2·20	0·55
Makorsi River Ranche	0·42	0·17
Marthadale	0·52	—
Marah Ranche	0·25	0·18
Morgenster	0·63	Nil
Ndanga	0·74	0·28
Pamushana	0·52	0·25
Silver Oaks	0·32	0·10
Tokwe River Ranche...	0·47	0·13
Victoria	0·15	—
MATABELELAND :		
Belingwe—		
Albany	0·72	Nil
Anglo-French Block	1·47	—
Filabusi	2·80	Nil
Fort Rixon	2·07	,,

RAINFALL *(Continued).*

Station	May	June
MATABELELAND—(Continued)		
Belingwe—continued		
Infiningwe	—	—
Insiza South	—	—
Insiza (Railway)	0·45	—
Mooifontein	—	—
Shangani (Railway)	Nil	—
Tamba	0·80	0·16
Thornville	0·67	—
Wedza	1·35	0·03
Bubi—		
Inyati	Nil	Nil
Leighton Farm	—	—
Lochard Experiment Farm	0·78	0·02
Bulalima—		
Figtree	—	—
Mholi (late Magot)	0·72	Nil
Marula	—	—
Plumtree School	—	—
Riverbank Farm	1·05	—
Solusi	0·70	Nil
Syringa	0·92	,,
Tegwani	0·48	,,
Bulawayo—		
Balla Balla (Railway)	0·56	—
Bembesi (Railway)	0·75	—
Bulawayo (Railway)	—	—
Crombie's	1·23	Nil
Edwaleni	—	—
Essexvale	0·62	—
Government House	1·67	Nil
Gwaai (Railway)	Nil	,,
Heany Junction (Railway)	1·65	—
Hope Fountain	0·62	—
Imbesu Kraal	0·65	0·01
Impondemi	—	—
Keendale	1·03	0·03
Khami	0·55	Nil
Lower Rangemore	0·79	,,
Matopo Mission	—	—
Maxim Hill	0·70	Nil
Melinakanda Junction	—	—
Nyamandhlovu (Railway)	Nil	
Observatory	1·02	—
Raylton	0·63	
Rhodes Matopo Park	0·61	Nil
Umgusa	2·12	—
Umkien	—	—

RAINFALL *(Continued)*

Station	May	June
MATABELELAND—(Continued)		
Gwanda—		
Antelope Mine	0·33	—
Gwanda (Gaol)	0·29	0·05
,, (Railway)	0·32	—
Malundi	—	—
Mtshabzi Mission	1·26	0·06
West Nicholson (Railway)	0·31	—
Gwelo—		
Coppy Nook	0·55	
Globe and Phœnix (Railway)	0·38	—
Gwelo (Gaol)	0·77	0·06
Gwelo (Railway)	0·37	0·06
Hagley	0·24	—
Indiva Farm		—
Lalapanzi	0·34	—
Lalapanzi (Railway)	—	
Lower Gwelo	1·04	Nil
Que Que	0·36	,,
Rhodesdale Estate	0·29	,,
Selukwe (Railway)	0·97	—
Sikombela Farm	0·28	Nil
Umhlali Farm	—	—
Woodendhose	—	—
Mafungabusi—		
Gokwe	0·20	—
Inyoka	Nil	Nil
Mangwe—		
Empandeni	0·85	Nil
Garth	1·00	,,
Tuli—		
Lamulas	0·67	0·07
Langalanga	0·02	Nil
Makalali	0·18	,,
Manantji	0·36	,,
Mazunga	0·17	0·02
M'pande	0·54	0·16
Tuli	0·33	Nil
Wankie—		
Bombusi	Nil	—
Guyo	—	—
Malindi (Railway)	0·13	—
Victoria Falls	Nil	Nil
Victoria Falls (Railway)	,,	—
Wankie Hospital	0·08	—
Wankie (Railway)	Nil	—

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1915		
			August	September	October
Bembesi	Queen's Mine Hotel	F. C. Anderson	6	3	1
Bindura	Bindura	A. C. Mills	14	..	9
Charter—Mgezi	Beatrice Mine	W. Krienke	25	29	27
Central	Umvuma	B. M. Yorke	..	..	30
Eastern Border (South Melsetter)	Various farmhouses	J. W. Scott	4	1	6
Enterprise	Arcturus Hotel	J. Watson	4	1	6
Felixburg	Umvuma	E. C. Boardman	28	25	30
Figtree Branch, R.L. and F.A.	Figtree Hotel	W. H. Robertson	7	..	2
Gatooma	Gatooma	T. J. Golding	21	18	16
Gazaland	Chipinga	W. Wood	28	25	30
Greystone	Roodeheuvel Farm, Shangani	J. W. Spencer	14	11	9
Hartley	Hartley	H. Savory	7	11	9
Headlands	Headlands	J. M. Harvard	28	..	30
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. H. Twilley	14	11	9
Insiza—Shangani	Shangani	N. C. St. J. Brislin	7	..	..
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	14	11	9
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	..	..	..
Lomagundi	Sinoia	W. Abbott	21	18	16
Macheke	Macheke	W. J. K. Webster	No dates fixed		
Makwiro	Makwiro	T. R. McLellan	20	17	15
Marandellas	Marandellas Farmers' Hall	E. P. de Kock	7	4	2
Mangwendi	Mangwendi	Luke Green	..	1	..
Makoni	Rusape	H. Barnes Pope	7	..	2
Marula	Marula Siding	Mac. W. Ingram	28	25	23
Mashonaland	Commercial Hotel, Salisbury	W. H. Williamson	14	11	9
Matopo Branch, R.L. and F.A.	Sibali	W. Bathurst	..	8	..
Mazoe	Glendale Siding	R. S. Newett	11	8	13
Melsetter (North)	Various farms	Rev. R. Wodehouse	..	4	..
Midlands	Gwelo	C. H. B. Mercer	14	11	9
Northern Umtali	Farm "Summerfield"	R. O. H. Blurton	7	..	..
Norton and District	Norton Siding	T. A. Osler	7	4	2
Que Que	Que Que	E. J. Ross	21	18	16
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	27	24	29
Shamva	Shamva	J. M. Moubray	No dates fixed		
Selukwe	Selukwe	F. S. Clark	No dates fixed		
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	11	..
Umvukwe	Umvukwe	H. K. Bracewell	No dates fixed		
Umtali	Christmas Pass Hotel	J. S. Holland	7	4	2
Victoria	Victoria	H. S. Hoatson	18	15	20
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	14	11	9

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a ¼ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, i

which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Farm Seeds

Seed Maize.—The following varieties of seed maize grown at the Experiment Farm, Gwebi, will be available for sale this coming season :—

Hickory King, 8-row ;
Hickory King, 10-row ;
Salisbury White, 12-row.

There will be two grades of each variety, differing only in selection. First grade seed will be sold at 30s. per bag, and second grade seed at 25s. per bag.

As the supplies available are necessarily limited and the applications usually large, it is not expected that it will be possible to supply any one applicant with more than two or three bags of first grade seed. This will suffice to serve as a breeding plot, from which the farmer may be enabled to select his own seed the following season.

Miscellaneous Seed.—A complete list of other seeds available for free distribution on co-operative terms will appear in the October number of this *Journal*.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			

	£	s.	d.
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will

only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock: general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control;

insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Agricultural Statistics: Crops and Returns

Under the provisions of the Agricultural Statistics Ordinance, 1914, a Government Notice will shortly be issued requiring returns from all farmers relating to this season's actual harvest from maize, tobacco and the several other crops, etc., suggested at the Farmers' Congress. The forms will be issued during August, and the completed returns must be sent in to reach the Director of Agriculture not later than the 15th September next. If forms are not received, they will be forwarded upon application to the Statistical Clerk, Department of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
No. 62. Services of Agricultural Engineer.
No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.
No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
No. 94. Second Report on Experiments, by J. H. Hampton.
No. 125. Subterranean Water, by W. M. Watt.
No. 153. Citrus Fruit Trees—From Seed to Grove.
No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.
No. 156. Elephant Grass or Napier's Fodder, by J. A. T. Walters, B.A.
No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.
No. 166. Rhodesian Citrus Fruits—Exportation to London.
No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.
No. 185. Citrus Fruits—The Preparation of Oranges for Market, by C. E. Farmer.
No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.
No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.
No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.
No. 206. Hints on Irrigation : Small Earthen Storage Reservoirs, by W. M. Watt.
No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.
No. 212. Citrus Fruits in Rhodesia, by A. G. Turner.
No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.
Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
No. 106. Cultivation and Preparation of Ginger.
No. 126. Turkish Tobacco.
No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.

No. 138. **Tobacco Culture (Virginia)—Harvesting and Curing.**

No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.

No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.

No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.

No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.

No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.

No. 179. Buckwheat, by H. G. Mundy, F.L.S.

No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.

No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.

No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.

No. 194. Rye, by J. A. T. Walters, B.A.

No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.

No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.

No. 58. Onion Thrips, by R. W. Jack, F.E.S.

No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.

No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.

No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.

No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.

No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.

No. 147. Root Gallworn, by R. W. Jack, F.E.S.

No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.

No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.

No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.

No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.

No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.

No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.

No. 178. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.

No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.

No. 197. Chafer Beetles, by R. W. Jack, F.E.S.

No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.

No. 214. Some Household Insects, by R. Lowe Thompson, B.A.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.

No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.

No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.
No. 74. The Detection and Prevention of Diseases of Stock in Rhodesia, by Ll. E. W. Bevan, M.R.C.V.S.
No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.
No. 95. Oestrus-ovis in Sheep, by Alec King.
No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.
No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.
No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.
No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.
No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.
No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.
No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.
No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.
No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.
No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.
No. 163. Feeding and Care of Imported Cattle, by R. C. Simmons.
No. 167. The Construction of Dipping Tanks for Cattle.
No. 169. The Breeding and Feeding of Pigs for Bacon Factory Purposes, by R. C. Simmons.
No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.
No. 208. Water in the Diet of Live Stock, by Ll. E. W. Bevan, M.R.C.V.S.
No. 210. The Care and Feeding of Calves in Dairy and Stud Herds, by R. C. Simmons.
No. 211. The Fattening of Pigs on Granite Farms in Mashonaland, by R. C. Simmons.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.
No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.
No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.
No. 134. Plans and Specifications for Flue Curing Tobacco Barns.
No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.
No. 150. Dry Season and Droughts in Rhodesia, by the Rev. E. Goetz, S.J.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 157. Hints on Brickmaking, by G. T. Dyke.

No. 159. Gwelo Creamery : Hints and Suggestions to Farmers, by W. G. Elliott.

No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

No. 205. Home Butter Making, by R. C. Simmons.

No. 213. Hydraulic Rams, by W. Martin Watt.

Malarial Fever : How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

The Prevention and Treatment of Blackwater Fever, by Dr. A. M. Fleming.

Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law : Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc

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HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

D. & R.—Farm assistant; £5 per month and food.

W. T. S.—Energetic young man as assistant on mixed farm in Midlands district.

A. H.—For gentlemanly young man of from 16 to 20 years of age to learn stock farming, etc.

W. H. E.—Young man as learner on fruit and dairy farm; one who can speak native language preferred. Board and lodging in exchange for services.

SITUATIONS WANTED.

P. G. C.—As manager of farm. Experience in all branches of farm work.

W. E. R.—Employment wanted in pruning trees. Thoroughly experienced; worked in California and with Mr. Pickstone, Cape Colony.

W. E. P. N.—As assistant on farm. Good practical experience. At present residing at Christiana. Would like fare paid, which can be deducted from salary.

C. S.—As assistant on farm. Six years' experience with cattle and general farming in Cape Colony.

J. L.—As assistant on farm; general knowledge of agriculture and good cattle hand; experienced in brick-laying, carpentering, fencing, etc. Good references.

F. R. T.—As manager on farm; thoroughly experienced in mixed farming; 29 years in South Africa and 7 years in Rhodesia; good references. Salary, £6 per month and everything found; percentage of crops.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:—*

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed

by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 86 of 1915.] [25th March, 1915.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease, to wit, African Coast Fever, on the farm Sigaro, in the native district of Salisbury, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the undermentioned area to be an area actively infected with African Coast Fever for the purposes of the said Ordinance :—

An area bounded by and including the following farms: Sigaro, Patterson, Mgutu, Pearson Settlement, Passaford, Spa, Weltevreden, Bitton, Syston, The Lily, Ballineety, Penrose, Derry and Forest Reserve.

No. 247 of 1915.] [23rd July, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 526 of 1914, 167, 175 and 179 of 1915, and in terms of section 12 of Government Notice No. 50 of 1912, declare the following to be areas of infection and guard areas :—

1. SALISBURY AND MAZOE NATIVE DISTRICTS.

(a) *Areas of Infection.*

(1) M.T.C., Gallagher's Lease, Makabusi, Epworth, Adelaide and Glenwood Farms.

(2) Sternblick Farm.

(3) Bluff Hill Farm.

(4) Tynwald Farm.

(5) Sigaro Farm.

(6) Mabelreign Farm.

(7) Borrowdale Estate, Helenvale, Glen Lorne, Luna and Carrickcreagh Farms.

(8) An area bounded by and including the following farms :—Belford Estate, Belford Estate No. 2, Belford Estate North, vacant land on which the Jumbo Mine is situated, Whitfield, Yarrowdale, 100 acre lots, Tjibakwe and Belford Estate No. 3.

(b) *Guard Area.*

An area bounded by and including the following farms :—Bitton, Syston, The Lily, Killiemore, Penrose, Derry, Glen Lussa, Rainham, Gillingham, Park Ridge, Crowborough, Lochinvar, eastern sub-division of Willowvale, Glen Norah, Hopley, Saturday Retreat, Reserve, Odar, Stoneridge, Eyrecourt, Boutelle, Twentydales, Nalire Reserve, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Moo Leegte and Reserve.

2. UMTALI NATIVE DISTRICT.

(b) *Guard Area.*

The farms N'odzi and Nyagari and the Penhalonga Valley.

3. MELSETTER NATIVE DISTRICT.

(a) *Areas of Infection.*

(1) Highlands, Rockwood and Joppa Farms.

(2) Clearwater, Nooitgedacht, Randfontein and Avontuur Farms.

(3) Enhoek, Ravenswood, Roslyn, Woodstock, Landsdown, Heilrand and Kenilworth Farms.

(4) Wolvedraai Farm.

(5) Houtberg Farm.

(6) Springfield Farm.

(b) *Guard Area.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nayanyadzi River.

No. 147 of 1915.] [6th May, 1915.

ENZOOTIC ABORTION.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare the farm Great B, in the native district of Mazoe, to be actively infected with the disease known as enzootic abortion for the purposes of the said Ordinance.

No. 381 of 1914.] [3rd September, 1914.

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of this Notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe and Gwanda.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 527 of 1914.] [31st December, 1914.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the 1st day of January, 1915, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including the Salisbury native district bounded by and including the following farms:—Lilfordia, Saffron Walden, Kilworth, Porta, Outspan, Clements' Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Odar Outspan, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Caledonia, Hartmans, Chishawasha, Glenlorne, Borrowdale, sections 4 and 1, The Willesden, Lowdale, Ingleborough, Mguta, Great B. Umsasa, Springvale, Passaford, Spa, Fairview, Nalire, Penrose.

No. 70 of 1915.] [4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzing wane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms :—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar, Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 206 of 1915.] [25th June, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

All surveyed farms in the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge and Biriwiri, including the Ingorima Reserves and Mafusi Reserve, and excluding the farms Umzelezwe, Nyagadzi, Mhungura, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera.

No. 505 of 1914.] [10th December, 1914.

CLOSING OF GATES ON ROADS, ETC.

UNDER and by virtue of the powers vested in me by section 26 of the "Fencing Ordinance, 1904," I do hereby provide that travellers passing through a gate erected on a public or private road in terms of section 25 of the said Ordinance, and omitting to close such gate after having passed through, shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address..
2. Number and Class of Cattle to be imported..
3. Area or Farm and District where Cattle are at present located..............
....
4. Area or Farm and District to which Cattle are to be moved..................
....

Applicant's Signature..

Date..................................

Application..........................

Permit No...........................

ANNEXURE "B."

I, ... residing on the farm .... in the district of .... do solemnly and sincerely declare that the .... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals .... Bulls .... Heifers ....

Breed ....

Seller's Name and Address ....
....

Purchaser's Name ....

Place in Southern Rhodesia to which animals are being sent
....

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at .... on this .... day of.................. before me,

....

Resident Magistrate for the District of ....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London
Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, Etc.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries:—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals, nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date................................., 19...

Place ....

....

Signature of

Government Veterinary Surgeon.

Number and general description of animals :

..............Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent :

....

Owner's name and address :

....

....

Place in Southern Rhodesia to which it is desired to send the animals

....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at ....
in the district of... .... in the..............................
Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to...................................† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at..on this..............
day of..before me.

....
Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent................................
Owner's name and address..
....
Place in Southern Rhodesia to which animals are being sent........................

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available:—

Nyamandhlovu.
Gwanda.
Plumtree.
Fort Rixon.
Belingwe.
Inyati.
Fort Usher.
Mphoeng's.
Holi.
Filabusi.
Gwaai.
Figtree.
Umvuma.
Que Que.

No. 375 of 1912.] [28th November, 1912.

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches; and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Open areas.

The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following areas in the Hartley district and the Sebungwe district until further notice.

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

Sebungwe District.—From the confluence of the Sengwe and Lutope Rivers up the Lutope to its headwaters, thence in a south-east and easterly direction following the southern edge of the escarpment, leaving Meare's farm to the south, to the Mafungabusi Peak, thence northwards along the escarpment to the Njelele River, and down that river to its confluence with the Sanyati River, thence northwards down the Sanyati River to its confluence with the Piriwiri River, thence direct in a north-westerly direction to Picaninyemba, and thence along the footpath to Nenyunka on the Sengwe River, thence southerly up the Sengwe River to its confluence with the Lutope.

Elephants, Hartley District.—Notice No. 168 of 1914 permits the shooting or capturing of elephants on or within five miles of the farm Walden, in the Hartley District, for a period of one year from 9th April, 1914.

The game specified may be shot in these open areas without a licence.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

No. 390 of 1912.] [19th December, 1912.

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds :—

(1) Great Locust Bird or White Stork (*Ciconia alba*);

(2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*);

(3) Small White Heron or Cattle Egret (*Bubulcus ibis*);

(4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 171 of 1915.] [21st May, 1915.

PROTECTION OF GAME ON COMMONAGES.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that up to the 30th day of April, 1916, all game within the limits of the commonage or townlands of Umtali shall be strictly protected, and shall not be hunted or destroyed.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 217 of 1915.] [2nd July, 1915.

WATER REGISTRAR.

IT is hereby notified for public information that His Honour the Administrator has been pleased to appoint Bernard Haslewood, Esquire, as Water Registrar, in terms of the Regulations published under the "Water Ordinance, 1913," *vice* the Chief Clerk, Attorney General's Office.

All communications for the consideration of the Administrator in terms of the said Ordinance or Regulations should in future be addressed to the Water Registrar, Department of Agriculture, Salisbury.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per ℔. or fraction thereof, up to a limit of eleven ℔s. in weight.

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G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

Bulawayo Waterworks Dam. 1915.

THE RHODESIA

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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the Journal. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* Journal *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

Sub-Editor.—Mr. W. E. Meade, who for three-and-a-half years has filled the post of Sub-Editor of this *Journal*, left for Europe at the end of August with the intention of offering his services to assist in the great fight against the common foe of civilisation. Whatever may be the merits of the *Rhodesia Agricultural Journal*, and we believe it will survive comparison with other publications of the same kind, no inconsiderable share of the credit is due to Mr. Meade, especially in respect to arrangement and general appearance. We believe that our readers will join his colleagues in the Department in wishing Mr. Meade the best of luck and a happy return.

GRADING MAIZE.—The Government is anxious to do all it can to facilitate the export of this year's large surplus of maize in excess of internal requirements, and in particular to aid the Farmers' Co-operative Society and other exporters in their endeavour to establish uniform standards of quality of grain to place on the overseas markets. With this object in view, the Government has this season, for the first time, employed graders to travel throughout the grain districts and examine every bag of the immense stocks of maize at the railway stations and sidings where they were stacked ready to be entrained. Graders' certificates have been issued for two qualities only, viz., Flat White No. I. (F.W.I.) and Flat White No. II. (F.W.II.), these being the classes registered in Europe at the various Corn Exchanges, where samples are deposited for the buyers' guidance. The grader's mark on the bag is the buyers' guarantee that the grain is up to this standard. It was inevitable that there should be a certain amount of grain which fell below standard, for which no certificate could be given, but the percentage of rejected bags has been very small, and complaints from growers few. The chief reasons leading to rejection have been dampness, dirtiness, careless sacking and too high a proportion of discoloured and broken grains. It is in the hands of the farmer to correct these faults himself. The difficulties of the work the first year have been considerable, and there still remain large quantities of maize to be examined. It has not been easy to keep in touch with the various graders moving up and down over long lengths of railway line, and the difficulty has been added to by the continual need of returning upon their tracks owing to the irregular delivery of grain at certain sidings and often at points on the line where there is no siding, in which cases the grader has often had to walk considerable distances. All this work is being done free of charge, but we believe the results have been so satisfactory as to repay amply the labour expended. Many farmers resident near the line have been most helpful and hospitable to the graders, and to them we express our thanks.

COURSE OF LECTURES ON DAIRY FARMING AT INORO, MARANDELLAS.—By the courtesy of Mr. Scott, of the farm

Dairy Camp, Numwa Farm, Marandellas, August, 1915.

Interior of tobacco barn. Numwa Farm. Marandellas. used as lecture room, August, 1915.

"Numwa," Inoro, in the Marandellas district, a very successful four days' course of lectures and demonstrations on dairy farming was held on the 16th to 19th of August inclusive by Mr. Simmons, assisted by Mr. Walters and Mr. C. C. Girdlestone. The course included demonstrations and practical work in butter-making, the separation of cream, milk-testing, and lectures on cattle-breeding, feeding and management, farm buildings, swine husbandry, poultry rearing, the growing of crops for winter feed, and generally all that pertains to modern dairy farming. An excellent lecture hall and working dairy was improvised out of Mr. Scott's packing shed, a marquee was erected for the accommodation of some of the men students, while camping ground was provided for married people and others who brought their own wagons. Arrangements were made for all to take meals together in another large shed, cooking, waiting, etc., being ably supervised by Mr. Girdlestone, with the help of some of the ladies of the district. About twelve people were able to attend the whole course, while there were from fifteen to twenty-five people present at each lecture. Examinations were held at the conclusion for both men and ladies, at which the following were successful in gaining 75 per cent. of marks, and thus earning a pass certificate issued by the Department of Agriculture, viz. :—Miss Laura Thornton and Mr. G. A. Henderson, who were first in their respective classes, and Messrs. E. Plewman de Kock, F. W. Bradshaw, Manley T. Palmer and A. T. Nicholson.

Both lecturers and students were indebted to Mr. Scorror, of the Settlement Farm, for the loan of a number of pure-bred and grade cattle for demonstration purposes, and to Mr. Scott for similar facilities in connection with pigs. This is the first occasion on which a course of lectures has been held at a farm centre, thus enabling students to attend much more frequently and at less cost than when similar courses are held in the towns. The evident appreciation of those who participated, and the keenness with which they attended to work from 6 a.m. to 6 p.m., with only short intervals for breakfast and lunch, were most encouraging. The small number of those who entered for the examinations was a little disappointing, but was due largely to the inability of many to attend all the lectures, and to a certain shyness on the part of more elderly people to submit themselves to examination.

ANALYSIS OF PEANUT CAKE.—The management of the Oil Factory has informed us that the method of obtaining cake from peanuts has been altered since the article by Mr. Holborow, under the title of "Analysis of Peanut Oilcake," appeared in the August *Journal*. On page 527 the following occurs :—"If the remaining cake be heated and again put under pressure, a further quantity of oil is obtained and the resulting cake is placed on the market at £10 per ton as a feeding stuff for stock." The original method, and one that is extensively used in Europe, of pressing twice, once in the cold and subsequently on heating, has been modified to suit the *modus operandi* of the factory, and the peanuts are now only pressed once, and that after heating. The analysis of the once pressed cake should not materially differ from the composition published in the August *Journal*, but a sample of the new cake has been obtained by the Government Agricultural Chemist, and by the time this leaves the press an analysis will be at the disposal of enquirers and intending buyers.

Since the above was written, the Agricultural Chemist has completed his analysis, and we give his figures below :—

Salisbury Oil Factory Once Pressed Cake (hot pressure) :—

Moisture	6.39
Ash	3.74
Proteid (nitrogen x 6.25)	40.72
Fat (ether extract)	12.99
Fibre	3.67
Carbohydrates	32.49
	100.00

MENDELIAN PRINCIPLES IN PRACTICE.—It is astonishing to observe how Mendel's "Law," which was brought into prominence long after the death of its brilliant discoverer, has revolutionised the study of heredity, and what a flood of light it has thrown upon some of the most difficult problems connected with the transmission of parental characters. A study of the article by Mr. Hornby, which appears on another page of this issue, will suffice to shew that the full meaning of the theory is still a matter for investigation, and that its application to the important work of improving breeds of plants and animals will not be completely worked out for many years to come. At the same time it is an interesting and significant fact that no scientist carrying on research into questions of heredity would think of ignoring the Mendelian principles: indeed, most practical experiments on the subject are to-day conducted directly on Mendelian lines. Many valuable results have already been obtained, and their number is steadily increasing. For instance, in "Nature," 12th August, 1915, we read :—" In the 'American Naturalist' Dr. Raymond Pearl continues his studies in heredity with reference to questions of practical breeding with a paper on Mendelian inheritance of fecundity in the domestic fowl. Large egg-yield, especially during the winter months, is shewn by experiment to depend upon the presence of two Mendelian factors in the germ-cells. . . . Thus is confirmed the belief of some poultry fanciers that the father is of greater importance than the mother for the establishment of a good laying strain."

This illustrates the truth that theory often follows humbly after practice. It also shews the immense value of research work in eliminating the empirical element and stimulating the practical breeder who is already on right lines by giving him greater confidence. At the same time, a sure guide is furnished for the breeder who may have been in doubt or working on wrong lines.

DHAL AS A SUB-SOIL PLOUGH.—The Agricultural Research Institute, Pusa, India, has recently issued a bulletin dealing with the important subject of " Soil Ventilation." The paper discusses several different means by which the ventilation conditions of soil may be improved, and amongst them mentions the beneficial effects of certain crops whose root systems are capable of opening up the sub-soil, making it more porous, and so increasing the circulation of air therein to the great advantage of succeeding crops. Of particular interest is the recommendation of two crops having this property in a high degree, both of which are familiar to Rhodesian farmers. They are *dhal* and *sweet potatoes.* We extract the following, in which we have made verbal alterations by changing words in the Indian vernacular and by the omission of references to conditions peculiar to India.

"Besides the cultivation and breaking of surface crusts, there are several other natural methods of soil aeration, some of which are of the greatest value. Many plants aerate the soil and thus confer direct benefits on succeeding crops. *Dhal* (*Cajanus indicus*) is perhaps the best example of a crop which acts as a natural soil aerator. The root system of this plant is considerable; the tap root is long and grows down into the soil to a great depth. The lateral roots break up the soil in all directions, and when they are removed by white ants, after the crop is reaped, a system of small tunnels is left which helps materially in ventilating the soil. The effect of this aeration on the succeeding tobacco crop is very great, and the benefit of the dhal-tobacco succession is locally well known. The cultivation given to this crop after the monsoon also helps the aeration, while the organic matter added to the soil by the fall of its leaves and flowers also assists in the same direction. Dhal is the sub-soil plough of the ryot. The current ideas in Bihar district on the best method of converting rough grass land into arable cultivation should be mentioned at this point. Planters say that hardly anything will grow on grass land when it is first broken up, and they recommend *sweet potatoes* to begin with. After this, they say there is no further trouble and almost any crop can then be grown. There is no doubt that under rough grass the soil gets very little aeration and is in a thoroughly packed and sour condition." This refers to land in a particular district of India, and must be taken as only partially applicable to grass lands in general. "Thorough aeration is necessary for such land, and this is given both by the preparation for sweet potatoes and also by the complete stirring of the soil which takes place when the crop is reaped. The sweet potato manages to thrive in a soil in which many other plants would be asphyxiated on account of the aeration caused by the swelling of its roots. This bursts open the land and lets in air. The gradual production of the root swellings acts like a mild explosive and shatters the soil. The sweet potato is the ryot's method of dynamiting the soil."

CO-OPERATIVE SOCIETY.—The Farmers' Co-operative Society held an adjourned general meeting in Salisbury on 17th September. In addition to the usual routine business, a subject of considerable importance was on the agenda paper, viz., a proposal to open a retail produce store for the sale of minor products of the land. We understand a committee was appointed to go carefully into the matter, and report in three months to a special general meeting of the Society. There seems to be some doubt as to the feasibility of initiating such a project at the present time, but the necessity of some arrangement for the better distribution of perishable and other products is recognised both here and in the Union. The South African National Union, in its report for 1915, refers to the subject in the following terms :—

"There is no doubt that the farmer does not obtain for some of his produce as much as he has a right to expect. The difference between the amount he receives and the price paid by the consumer is, as a rule, very large and often unreasonable. The co-operative movement was established to ensure better prices to the producer, and as regards a few leading lines, such as maize and wheat, it has done so. But a movement embracing all kinds of farm produce is just as necessary. . . . The person who can devise a scheme for effectually bringing the consumer and producer in closer relation will confer an immense benefit on the latter without taxing the former. . . . The co-operative collection and sale of all kinds of perishable produce is a prime necessity of the agricultural industry."

WATER ORDINANCE.—In this number of the *Journal* will be found summary of Government Notices which have recently appeared in the *Government Gazette*, notifying the public that certain applications for the right to use water have been received by the Administration. These applications are made in terms of the Water Ordinance of 1913, and the Government is sparing no pains to advertise as widely as possible every application received, in order that no person or corporation who may think they are affected by a particular application shall be able to plead ignorance if they fail to lodge objections with the Water Registrar within the period allotted for receiving objections. Every application made by a competent applicant, in proper form, and on reasonable grounds, will be published in the *Gazette*, in the *Agricultural Journal*, and in the local newspaper circulating in the district concerned. In addition, copies of applications will be sent to post offices and to secretaries of farmers' associations in the districts concerned. It should be noted that publication of an application by Government Notice and otherwise constitutes no presumption whatever that such application will be successful.

Grading of Cattle in Rhodesia.

By E. A. Hull.

To Rhodesian cattle breeders there can be no more interesting subject than the grading up of stock. Irrespective of breeds and locality, the same problems confront each and all of us when aiming at a goal we hope in time to reach. There is little or no information of a definite character to be gained from your neighbour, as he too is working on theory, hoping by practical results to prove that his theory is right. The grading of stock in Rhodesia may, therefore, be said to be in its infancy. The little information I have to give to my brother farmers is the result of practical experience. Results have been obtained proving my theory to be right, but only up to a point.

Stock grading is purely a commercial undertaking. That is to say, you are endeavouring to turn your pasture to the greatest possible account, and the way to do that is, you believe, to grow stock which will mature quickly and sell at top prices as prime beef. Theoretically this sounds easy enough, but in attempting to carry it out in practice you are confronted with many problems which time and results alone can solve. Having selected the breed you intend to grade up with (and in this you will be guided by your locality and veld), the first thing to do is to select a good pure-bred bull with plenty of masculinity and character and of good robust constitution. He need not be perfect in symmetry, but he must have good bone and substance. A bull of this description will stamp 75 per cent. of his progeny with his likeness and colour. Your first cross is always a success, and your second cross should be a greater success, provided the breed you have selected is suited to your veld and conditions. If this is not so (the second cross is the tell-tale), you will at once know that the improved breed you have chosen is not suited to your veld and conditions and therefore cannot keep true to type. It is, therefore, useless for you to persevere. Either try another improved breed or go in for Africanders.

We will, however, suppose that the breed you have chosen is suited to your farm and conditions. You will be anxious to fix the type of your herd with as little delay as possible. To do this I have found inbreeding must be resorted to—that is, breeding the sire to his own progeny. It must be clearly understood when talking of grading up that your foundation stock are either native or Africander. I am not advocating this system where the foundation stock are already grade stock. In grading up from native or Africander cows, your sire blood is distinct from the dam blood. The progeny will have three-quarters blood of the dam and one-quarter blood of the sire, but will in 75 per cent. of cases bear the image of the sire. By breeding the sire back to his progeny you fix the type immediately, without in any way sacrificing constitution. You have bred a full-blood bull on to a cow that only has one-quarter of the bull's blood in her veins. I have been most successful breeding on those lines. I have also tried mating half brother and sister—the brother pedigree and the sister half native by the same sire—but not with such good results as breeding the sire back to his progeny. This is as far as I have gone in inbreeding, and I do not propose going any further. My problem now is mating, but as this does not come under the heading of grading I shall not touch on the question. It is a well-known fact that one of the finest Shorthorn bulls ever bred was the result of breeding the son to his mother, which produced a heifer calf, and then breeding the same bull to his daughter. This, however, is inbreeding in the hands of an expert.

In raising a good steer which will be marketable at an early age, the first essential is milk. Your native cow has not very much milk, but the little she has is of good quality and she will always do her calf from a native bull well. In crossing her with a bull of improved breed, she produces a calf nearly twice the size of her ordinary calf and one which is bred to come to maturity quickly. She will manage this fairly well. But let us suppose for a moment that the sire of this calf is a bull that has been raised on a foster mother, his own mother (though standing up to her belly in clover) not having had sufficient milk to raise her calf. This cross-bred calf will have still less milk than the native cow, with disastrous results to the next generation. I, therefore, strongly advocate that for grading up your bull's dam should be a cow that is a good milker, and if possible one with a good percentage of butter fat in her milk. I say the latter advisedly. I have had many cows, good milkers, whose calves were always miserable, pot-bellied brutes, in spite of running with their mothers all day. I could not understand the reason until I tested their mothers' milk, and found in most cases it was below the standard of 3 per cent. butter fat.

The ordinary methods of cattle farming, *i.e.*, kraaling, will not do if you intend to grade your stock up high. Kraaling may do all right for the first cross, but for the second cross and ever after your stock must have absolute freedom to eat, drink and sleep whenever they like. It takes a given amount of feed to produce a given amount of beef, and the beast that assimilates the greatest amount of food in 24 hours is the one that is putting on the greatest amount of beef. Unless you allow your improved beast the opportunity for fulfilling the object for which he is bred, why breed him at all?

How often one sees a well-bred cow in a native's kraal, having been sent there by her master to be looked after, panting in the sun at 10 or 11 o'clock in the morning, the native believing it to be the right thing to keep the cattle in late, and when at last she is allowed out she makes for the first shady place she can find and there she stands during the heat of the day, while her tough-hided mates are feeding unconcernedly in the sun. As it gets cooler the cow will come out to feed, but the herd boy wants to get his cattle in early, as he is off to a beer drink. The wretched cow is, therefore, driven back to her kraal as hungry as she was when she left it in the morning. The verdict of the owner is that the improved beast is useless for this country. But turn that same cow out in a paddock with the rest of the native stock and I maintain she will do every bit as well and breed as fast, the only difference being that every calf she produces is worth three of the native cow's.

Until a farmer is prepared to fence his farm and allow his stock to run day and night, my advice to him is to leave well-bred stock alone and breed Africanders, a breed which will stand a good deal of knocking about and still be profitable. Ride about in your paddocks at 8 o'clock on a summer morning, and you will not find a beast grazing; they are lying in some shady place chewing the cud, and they will not move the whole day except to change position for shade till 5 p.m. Note, too, the difference in the kraaled beast compared to one that is running day and night. The kraaled beast comes home with its left side "fit to burst," having crammed all the food it possibly can into its belly before being driven back to its kraal. You never see this in a paddock beast. There is no hurry; it never overeats itself, and what it eats does it infinitely more good, as the food is properly digested.

Much of the early development of the steer or heifer depends on its calfhood. A stunted calf never makes a quick-maturing beast. It is not, however, the calf that suffers so much in this country as the yearling or weaner. The weaning of calves usually takes place at the worst seasons of the year, namely, midwinter and spring. The calf, deprived of its milk, has to struggle along on the veld at its worst. The result is a very considerable set-back to the animal.

My experience is that calves weaned in summer and autumn go right away from the winter and spring weaners. They do not miss their milk, as there is plenty of green grass to take its place, and they rarely lose their calf fat. Autumn and winter calves, on "formation" veld, are far healthier than spring and summer calves. I do not, however, think this applies to granite and sandstone formations. Your cow feeding a calf will face a hard winter and spring a great deal better than a cow carrying a calf, and by calving your cows down in autumn and winter, they are always fat, whereas some of those that have been raising a calf and carrying another at the same time during the spring months are often so emaciated that they either die or it takes them a year to recover. My percentage calving down in winter has been as high as 92 per cent. All my dairy cows are, however, fed, but where I have turned cows out to raise bull calves in paddocks

Seed Maize. "Salisbury White,"—final selection—Gwebi Experiment Farm, 1915.

without feed the results have been the same. I give the latter example as all these cows are pure bred, and provided they have a free run can do for themselves on the veld as well as any other cattle.

Your bull should always be kept in good condition, if he is to give you strong and robust calves. A well-kept bull should be able to get 100 calves yearly.

No beast is allowed into the veld which has been kept for winter feed till the beginning of July. It makes a great difference to stock to have good clean pasture to go into where none of the better grasses have been eaten out during the summer months. The best of this veld is kept for the calving and in-milk cows raising calves.

As to how far we shall be able to go with our grading up, I am not prepared to say at present. I have a fair percentage of my herd pure bred and a good number seven-eighths bred, and up to the present see no reason why I should not go right on till the whole herd is pure bred. I may, however, find it advisable to go back a step and introduce a strain of Africander. It will then be a matter for very careful consideration as to which will be the most profitable—to keep your herd pure and make provision for them, or to go back a step and breed a slower maturing beast of not such good quality.

With the price of beef on the upward grade in the world's markets I think it will always pay best to produce the highest quality of beef, and this class of beef is only obtainable from improved breeds of cattle. My vote, therefore, goes for grading up high and feeding. The saying that "half the breed goes down the throat" is true, but it is the fact of the breed being there that makes the beast worth feeding. Whether for dairy or beef, it is only the beast that responds to feeding that pays to feed, and that beast is from the improved breeds.

Technical and Scientific Instruction in Agriculture.

By R. C. Simmons.

Five and twenty years ago the average farmer regarded those whom he variously described as scientific farmers, theoretic farmers and agricultural "experts," with a peculiar accent on the "experts," as objects for pity rather than blame, but in any case as being of very little use to the agricultural community. To-day, those whose business it is to impart scientific and technical instruction in agriculture are accorded a much more patient hearing; whether it be that they, as a body, have improved in their methods, or the farmer has become wiser, one is not prepared to say, but such undoubtedly is the case.

The writer feels that he has some knowledge of this matter, because he has been in the position of both pupil and teacher. In his earlier business years as manager to a large practical farmer he came in contact with a number of scientific agriculturists who have since done (and as he now knows were then doing) good work, but to whom both he and his practical friends accorded very little serious attention. After a number of years circumstances induced him to listen to these same scientists; to study seriously their teachings in conjunction with his own practical work. As a result he has no hesitation whatever in saying that one may arrive at a given standard of efficiency by means of science with practice in at least one-third of the time that one can by means of practice alone. Especially is this the case in a country like Rhodesia, where one has so few opportunities of seeing fully-developed and perfectly-organised farming concerns.

Perhaps the reader will say, "This is no very great news; one knew this more or less long ago." Nevertheless, there is still a large number of men who, notwithstanding the fact that they are knowledgeable business men, are always inclined to scoff at anything that savours of science, and who will scarcely take the trouble to see whether or not there is any good in it.

As an instance of what is meant by this, the writer was recently on the farm of a friend of his who shewed him a number of pigs doing excellently well. They were housed in a disused tobacco barn, to which was attached a yard, the fence of which was efficient, but was composed of odds and ends of wire, parts of old ploughs, barrel staves and the like. The troughs were mostly inverted railway sleepers. The yard and barn were well bedded up. The ration given was a very suitable mixture of mealies, potatoes, pumpkins and skim milk properly cooked and mixed. The owner said, however, "This is how we keep pigs; we can't afford all the fancy things you people (meaning officials of the Agricultural Department) advocate, and yet look at the pigs; they are well enough." Now, this man is a practical, knowledgeable farmer; he was carrying out every essential to the health and well-being of his pigs in regard to light, air, coolness, dryness, bedding, space, and so on; also, the pigs were properly fed in clean troughs, and yet he thought he was proceeding on totally different lines from those advocated by the Agricultural Department. The sole point of difference was that, in describing a pigsty, the Department had written of a wire fence and a building shaped like a pigsty and not like a tobacco barn.

One cannot, in technical pamphlets, write specially detailed advice suited to every man's circumstances and environment; one can only describe the principles which must be adhered to if success is to be obtained. When one writes, for instance, of a pigsty built of brick and iron, of certain dimensions, and with certain appliances, one does not mean that a pig will not thrive in a building of any other shape or material, but is endeavouring to give a mental vision of the character and minimum requirements of a good pigsty. When one describes a cowstall of a certain plan and feed of a certain kind, one is not giving, as it were, the only reliable recipe for those things, but merely an example of the kind of thing that will usually be found to be the most convenient and profitable.

The best and most modern cowshed (in point of view of essential characteristics) that the writer has seen in this country is built of poles, dagga and thatch, with a brick manger. Everything essential to the well-being of the cattle and convenience in working is there—air, light, warmth, room, facilities for keeping the cows, their food and the milk clean, shelter from wind, sun and rain, and no waste in any particular. Of course such a shed will not be efficient for a great number of years, but the question of whether it be wise or not to build a cheap temporary shed, with a view to building a permanent one later, is one that the individual can best answer for himself after reviewing his resources. Many farmers seeing such a shed will say, "Look at that shed; good enough for any cow that ever came into the country, and yet what nonsense they write in the *Agricultural Journal*." As a matter of fact, in the building of this shed the instructions issued some time since in the pages of this *Journal* have been followed implicitly, with the exception of one feature, which has not affected the cost of material or labour, but has been modified by the builder, and has much improved the design.

There is another point in regard to the carrying out of much of the technical instruction issued by agricultural departments and colleges which is often raised as an objection to its practical value. One often hears men say, "Oh! yes; that is all right if one had decent boys or white men, but it is impossible with Mashonas or raw Bureau boys."

It would, of course, be absurd to argue that the Mashona and the Bureau boy do not present very great difficulties in the way of the modern practice of farming, but, with all due respect to the farmers of Rhodesia, the writer would ask them if very often their own want of system and method does not constitute a difficulty.

The farmer in this country, and especially the beginner, is at a great disadvantage in that he can seldom see an old-established farm where the management and system is up-to-date and approximately perfect from which he may learn. Numbers of our farmers, from mere force of circumstances, have no appreciation whatever of the meaning of system in their farm management. For corroboration of this, the writer would appeal to those Rhodesians who have lately had some insight into European methods.

The writer, while feeling perfectly conversant with the many difficulties which the farmer has to contend with in this country, is nevertheless certain that much of the so-called elaborate methods advocated by agricultural departments and colleges can be carried out with little trouble and considerable profit by the exercise of some degree of system.

By system in one's work is meant organisation, punctuality, orderliness; the exercise of forethought with a view to avoiding confusion, duplication and omission of orders to employees; the proper apportioning of each employee's work (especially in the case of those tending cattle) and the insistence that each item shall be carried out at the same time and in the same order each day.

The majority of readers will say such perfection cannot be carried out on a farm, but do they ever ask themselves how it is carried out on mines, or contract work, in large hotels, and by all kinds of business people other than farmers?

More Household Insects.

By R. LOWE THOMPSON, B.A., F.R.G.S.,
Assistant Government Entomologist.

Whatever effect a previous article in the above connection may have had on the reader, it by no means exhausted the subject, hence numerous questions have been put to the writer as to why certain other pests were not discussed. The present paper, therefore, is an attempt to remedy that omission, and detail briefly various methods by which the uncalled-for intimacy of other household insects may be discouraged. One may first consider a cosmopolitan insect, known under many names, but easily recognisable by one.

THE BED BUG (*Cimex*).—No description of this insect should be necessary, since, apart from the round flat body, yellow and semi-transparent in the young stages, brown and opaque in the adults, the nature of the injury inflicted usually enables the victim to diagnose the cause. Nor in Rhodesia should there be that secrecy and shame-faced reserve which attends the presence of bugs in respectable English homes, for the boys' huts are usually full of them, and should a considerate master have occasion to visit a hut, perhaps to soothe some black sufferer with a dose of salts, or rouse him to a more acute sense of his responsibilities by other methods, care should be taken not to deprive him of any vermin. Houseboys may shed stray specimens on one's bed; a coolie may enclose a few gratis with the week's washing; one may occasionally collect them while travelling. Bugs are always liable to appear, and when their presence is suspected, a thorough search should be made at once. If a mosquito net is used, bugs very frequently hide by day between the frame and the net, and sometimes at dawn the irritated victim may see gorged bugs toiling in a painful and apoplectic manner up the net to their favourite resting place. In such a case the net, framework and all, should be taken down and boiled, after which a thorough search should be made throughout the bed-clothes, joints in the bedstead, cracks in the walls and flooring, behind pictures, and in fact in any adjacent crevices in which the extremely flat body of the bug enables it to secrete itself. Such crevices should be liberally washed or sprayed with paraffin. Turpentine is also useful, but as it is liable to roll off the polished surface of the bug, the following mixture is preferable :—

Turpentine, ¼ pint,
Methylated spirit, ¼ pint,
Corrosive sublimate, 1 oz.

The latter should be dissolved in the spirits before the turpentine is added. The advantage of this is that the turpentine is thinned out sufficiently to penetrate the tissue of the bug, and that after the spirit has evaporated a poisonous residue is left in the cracks. Stray bugs may usually be controlled by these measures, but further trouble arises when adult bugs have been allowed sufficient time to lay eggs, since the eggs are highly resistant to insecticides. In this strait is should be noted that the eggs hatch in five to ten days, and that it is necessary, therefore, to repeat the paraffining process after an interval of about ten to fourteen days, in order to suppress the newly-emerged young. In cases of severe infestation, recourse may be had to two fumigations with cyanide of potassium, which should be used at the rate of sixteen ozs. per 1,000 c.f., since bugs are highly resistant to the fumes. Owing to the extremely dangerous nature of the cyanide gas, fumigation should only be undertaken by those who have experience in the matter, and are armed with full instructions. Bugs in the boys' huts are usually beyond control, for even if fumigation is practicable, there is a strong probability that strange boys visiting the huts will re-stock them with the pest.

LICE (*Pediculus* and *Phthirius*).—Three species infect man, and here again Europeans are liable to become infested by contact with natives. Picannins employed as nurseboys, for example, not infrequently infest their charges with the head louse, and, once established, these insects breed with great rapidity. One observer states that a single louse may have 5,000 descendants in six weeks, if given the opportunity. He was a German. The eggs, usually known as "nits," are glued to the hair or clothing, and in a warm climate such as ours hatch out in about five to seven days, though in a cold climate they may be dormant for five weeks or more. Fortunately lice are easily controlled under normal conditions, and may be exterminated by washing the affected parts with medical carbolic acid one part, warm water 40 parts. This, it is claimed, kills all stages, though it may be well to repeat the operation at weekly intervals until all trace of the insects has disappeared. Paraffin can also be used, and should be left on the hair for a few minutes and then washed off with soap and water. Many other chemicals are also efficacious, amongst which one may mention various mercuric ointments which can be obtained from any chemist, and such coal tar derivatives as lysol, hycol, Jeyes' fluid, etc. At the same time, infested clothing or bedding should be baked or boiled, and hair-brushes, etc., washed with a strong carbolic solution. Under abnormal conditions, in warfare, for instance, the louse may be held more deadly than the heaviest artillery or the most ingenious devices of the enemy, for it is the louse which conveys that most fatal disease, typhus. Troops herded together, without facilities for washing, and often billeted in squalid, lousy surroundings, become infested, and should the typhus bacillus appear, the lice spread it from man to man. The Serbians and Montenegrins have experienced this in their arduous campaign, and lice, rather than Austrian forces, explain the deathly silence that brooded over those countries for several months. "Typhus," says the "Daily Graphic" for 17th April, "is sweeping Montenegro like a forest fire and none can escape it. Think of it—19,000 cases, men and women dying by the roads. We have also seen the ghastly pictures of Serbia under the same scourge." And that was due to a puny insect, not the size of a grain of wheat. The fact that typhus has not appeared in the western area may be attributed to the successful control of lice, and the following method, which is thoroughly satisfactory, is taken from the "British Medical Journal":—"The men found to be infested were directed to take a hot bath, dry themselves, and then lather their bodies with cresol soap solution (viz., Jeyes' fluid, 1½ ozs.; soft soap, 1½ lbs.; water, 10 galls.), and allow the lather to dry on; the shirts were washed in the same mixture in boiling water; the tunics and trousers were turned inside-out and the lather rubbed into the seams and allowed to dry on. Blankets were first soaked in the soap solution and then washed in the ordinary way."

FLEAS.—These small alert familiars of man and beast are liable to develop in an unusual manner in the tropics, and in this country one may, on entering a dusty, deserted hut or shed, find oneself a sudden centre of attraction to some hundreds of hoppers. Such breeding grounds can be cleared by watering them with carbolic acid, cyllin or Jeyes' fluid at about one part in 250 parts water, particular care being taken to saturate or clear up and burn any collections of dusty refuse, straw, matting, etc., in which the flea maggots live. Infested clothing may be freed by shaking or brushing it over a bath of water; the fleas that fall into the water are helpless and may be dealt with at leisure. Clothing can also be placed in an air-tight box and sprinkled with naphthalene, the fumes of which stupefy the fleas in about twenty-four hours. Domestic animals, though usually possessing their own particular kind of flea, may serve as hosts of the human flea, from which they may be freed by a variety of dips and soaps sold for that purpose. It should be noted that dips containing carbolic acid or cresol derivatives (Jeyes' fluid, hycol, lysol, etc.) must not be used for cats or puppies, which are strangely susceptible to these chemicals, and may die as a result of their application. Even full grown dogs may also suffer. One can, however, employ Keating's powder with perfect safety, standing the animal in a box, rubbing the powder into its hair, and when the fleas are stupefied, brushing them out and burning them. A weak emulsion of paraffin and soap in warm water can also be used, and an occasional bath of fresh sulphurated potash at 4 ozs. in 30 galls. of water will both improve a dog's coat and help to repel vermin. Keating's powder is made from dried flowers of *Pyrethrum cinerariæ-folium* and *Chrysanthemum coccineum*, and, judging from the localities in which they are grown, there seems no reason why this useful and harmless insecticide should not be grown in Rhodesia.

Only two fleas call for further comment—the rat flea, which is responsible for the transmission of bubonic plague, and the "jigger" or "chigoe" flea. The latter is said to occur in our eastern districts, and has the notorious habit of burrowing under its host's toe nails, from which coy retreat it should be cautiously extracted with a needle, care being taken not to injure the insect until it is outside the toe, and to wash the puncture with an antiseptic.

One may deal briefly with the remaining insects, of which we possess a considerable variety, that play havoc with our food and clothing, or disgust us by making an unexpected appearance in the gravy. The fact that the presence of a large and bloated cockroach in the soup has not been discovered until everyone has had a second helping does not add to the hilarity of a Rhodesian dinner party.

COCKROACHES.—As far as cockroaches or "black beetles" (so called presumably from the fact that they are not beetles, and are not black) are concerned, the following mixture is useful:—Plaster of Paris 1 part, flour 4 parts. This should be mixed, kept dry, and dusted liberally into the cracks frequented by the insects. It may also be dusted on to them at night. In either event the powder sooner or later adheres to their legs and feelers, and since cockroaches are cleanly insects, one might almost say fastidious in their appearance, they promptly lick off the mixture, which, passing into their stomachs, solidifies into a hard cake. This simple mixture is the basis of several proprietary insecticides sold at a proprietary price. Boracic powder may be similarly employed, or combined with two parts of treacle to form a poisoned bait, for it is curious that though practically non-poisonous to higher animals, boracic acid is powerfully poisonous to cockroaches. In dealing with bad infestations, these poisons should be used liberally for at least two months, the bait or powder being renewed at weekly or fortnightly intervals, since the eggs will not be affected by either, and take four to six weeks to hatch out. At the outset of the campaign it is well to surprise the insects after dark, and dust the powder on to them every night for about a week. If the bait is used, crumbs, food-stuffs, etc., should be removed or covered up at night.

ANTS.—Of the ants that invade our houses, one has to consider first the "sugar ant," a large, long-legged, honey-coloured ant, which is readily attracted to sugar; and secondly, the small dark brown ants, some of which are attracted to sugar, while others will ignore sugar, but feed voraciously on fat of any kind. For practical purposes, one may divide them into "sugar ants" and "fat ants," and to control them must first ascertain which food they prefer. This done, one may employ for the "sugar ants" 1 lb. of treacle or syrup, to which has been added 1 oz. of arsenite of soda dissolved in a little boiling water. For "fat ants," the Government Entomologist successfully used a bait made by thoroughly mixing 2 ozs. of white arsenic in 1 lb. lard. To avoid danger to domestic animals, these baits should be smeared on to strips of rag, and placed inside sound biscuit or tobacco tins in which holes have been punched, the holes being large enough to admit the ants. Several of these tins should be placed where the ants are most numerous, and the baits moistened or renewed from time to time. Immediate success must not be expected, for one must bear in mind that the ants invading a house usually represent only a small proportion of the entire nest. It is merely a regiment, so to speak, that is honouring the dwelling with its attentions, while the rest of the gang, amounting to several army corps, is in charge of the garden, and is ever ready to replace the poisoned party. The baits, therefore, must be kept going for several weeks. A modification of this method, used in California, may be mentioned. There, in the case of a veritable plague of ants, success was attained by using treacle containing only .25 per cent. arsenite of soda, the reason for the use of this weak bait being that, though ultimately fatal to the ants, its action was so slow that it gave the foraging parties time to carry the poison to the nest and feed it with fatal results to the queen ants and grubs. The destruction of the nest by this method is said to take about six weeks. If the nest itself can be discovered, and both species occasionally locate their nests under flat stones or boards, it should be opened up and watered with boiling water, cyanide of potassium (2 ozs. to the gallon), carbolic acid, or cattle dip. If available, the machine used for destroying white ants is very effective. If table legs are allowed to stand in tins or jars of water, the water should be filmed with paraffin to prevent mosquitoes breeding in these receptacles. Lastly, to keep ants away from hanging meat or water bags, the cord from which such depend may be passed through a cork inserted in the neck of an inverted whisky bottle, the bottom of which has been removed, so that the remainder forms a cup in which water and paraffin can be placed.

These more obvious pests having been dealt with, only a few minor pests of stored products, such as clothes moths, fish moths and various small weevils and beetles, remain. Of these, the fish moth is the name given to a small silvery fish-shaped insect about half an inch long, which is particularly fond of starch, and sometimes causes considerable injury by devouring the paste employed in binding books, or in mounting photographs, etc. Books may be protected by painting them with a solution of 1 oz. corrosive sublimate and 1 oz. carbolic acid dissolved in 2 pints of methylated spirit, and paste may be rendered distasteful to them by dissolving ½ oz. of copper sulphate in every pound of paste. It is also possible that 1 lb. of sweetened paste containing 1 oz. arsenite of soda might be an effective bait.

Preventive measures are best against clothes moths, and may be based on the fact that clothes that are in constant use are not attacked, and clothes that are brushed and hung out in the sun once a week rarely attacked. Clothes that are not required should be kept in moth-proof boxes, or tied up in a sound calico bag.

Weevils are also best controlled by preventive measures, such as the destruction of infested material, and the storage of sound material in weevil-proof bins or boxes. When it is desired to save substances infested by weevil or moth, recourse may be had to heat or to fumigation with carbon bisulphide. In the case of fumigation, the material should be placed in an air-tight receptacle—a sound barrel covered by wet sacking held down by weighted boards will serve—and the carbon bisulphide poured into a saucer or shallow dish placed on top of the article to be fumigated. One oz. of carbon bisulphide should be used for 15 cubic feet of space, and the receptacle left closed for thirty-six hours. The fumes are only slightly injurious to higher animals, and that only after a prolonged inhalation; nor do they injure food-stuffs or clothing, but they are highly inflammable and explosive if they come into contact with a flame, so that the operator must bear in mind that no light of any kind whatever should be brought near the chemical. As an alternative to fumigation, heat can be employed in some cases, since a temperature of 120 degs. to 130 degs. Fahr. is fatal to most pests of stored products; but to gain good results, care must be taken to secure these temperatures throughout the entire mass of the infested substances.

Two other classes of pernicious insects—borers and termites—have been dealt with in previous articles in the *Journal*, and reprints of these are obtainable in bulletin form.

Wanted.

The following numbers and indices of the *Rhodesia Agricultural Journal* are out of print, and have been enquired for by a reader, who is willing to pay 5s. each for them :—

Vol. I.—Nos. 5 and 6, plus index.
Vol. V.—Index.

In addition to the above, the following have been enquired for :—

Vol. I.—Nos. 2 and 6.
Vol. II.—Nos. 1 to 3.
Vol. III.—No. 1.
Vol. IV.—Nos. 1 and 4.
Vol. V.—No. 2.
Vol. X.—No. 2.
Vol. XI.—No. 3.
Indices to Vols. I., II., III. and V.

If any readers have any of these *Journals* and indices in their possession, and do not require them, we shall be very pleased if they will kindly send same to the Editor. If it is desired, they can be exchanged with any they may have missing, if available.

Half-Bred Cattle.

By H. E. Hornby, M.R.C.V.S.,
Govt. Veterinary Surgeon, Fort Jameson, Northern Rhodesia.

Judging from the various articles on the grading up of stock that have appeared from time to time in the *Agricultural Journal*, the use of half-bred sires is not a practice to be recommended, either in this country or in any other. In Texas, so Mr. Sinclair informs us, " they have no time for half-breds." In what was German South-West Africa, Dr. Nobbs tells us that " as a makeshift they have to use half-bred bulls," and that " the scientifically-produced pure-bred sire is the only one that can be relied upon to produce his like." That is where the half-bred bull is supposed to fail; he often does not succeed in begetting calves as good as he himself was. There are many men who, surveying the progeny of a good imported bull and a selected herd of native cows, have been content with the result of this first cross, but who, when they have mated a number of superior-looking half-breds, have been disappointed with the progeny; some have been good, but almost as many have been " weeds."

I do not think that I am stating an opinion contrary to the one generally held when I say that the chief, if not the only, scientific reason why, in order to form a good herd in this country, it is necessary to grade up from native breeds instead of importing pedigree animals of both sexes from Europe, is because of the susceptibility of well-bred animals to redwater and gallsickness. Just as every human being out here expects to be bitten from time to time by fever-infected mosquitoes, seeing that the majority of our black population harbours the malaria parasite; so every bovine runs a grave risk of being bitten by ticks harbouring the germs that cause the various diseases that are embraced by the term " plasmoses," seeing that the majority of cattle, at any rate native-owned cattle, harbours these parasites. Similarly, just as negroes are by nature far more immune to the effects of malaria germs than Europeans, so European cattle are far more susceptible to the effects of redwater and gallsickness parasites than the indigenous breeds. Moreover, the mating of immune and susceptible parents results in the production of half-bred progeny that possesses a degree of immunity intermediate between that of its parents. It is a very easy matter to rear native calves; more care is required to rear half-bred calves where these are exposed to tick infestation; while it requires extraordinary skill to rear pure-bred animals successfully under the same conditions. At the present time, then, the maintenance of a pure-bred herd of European cattle must be left to a few stud-farm specialists; while, on the other hand, careful selective breeding from native animals only will relegate to an immensely remote date the day when Rhodesia will be able to export good, saleable carcases derived from such a source alone.

In our quest for a serviceable animal, therefore, let us once more turn our attention to the half-bred. The best of these inherit much of the size, symmetry and early-maturing properties of the imported sire, and yet retain a considerable natural immunity against indigenous diseases. Let us see if there be any way of accounting for their failure to reproduce their like.

It is to be assumed that the reader is acquainted with the principles which underlie "Mendel's Law." I will quote them as they are laid down by Professor Walter in his book on genetics. They are:—

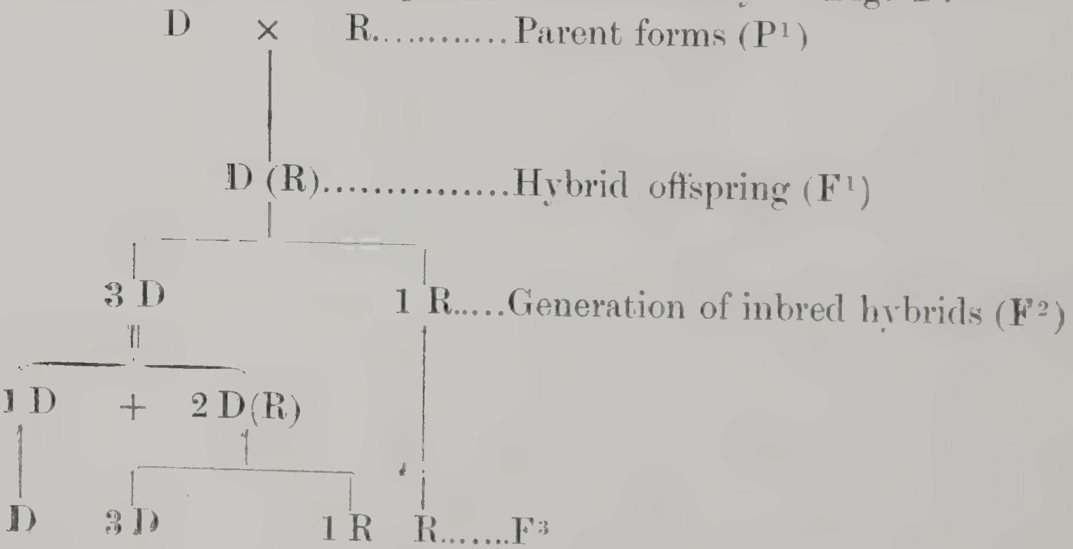
(a) *Independent Unit Characters.*—An organism, although acting together as a physiological and morphological whole, may be regarded from the point of view of heredity as consisting of a large number of independent heritable unit characters.

(b) *Dominance.*—In the germplasm there are certain determiners of unit characters which dominate others during the development of the somatoplasm (body other than germplasm). In other words, they determine the apparent character of the organism by causing that character to become visible.

The alternative *recessive* characters, although they may be present in the germplasm, are unable to become manifest in the somatoplasm so long as the dominant characters are present. When, however, a dominant character is absent, its recessive alternative becomes manifest.

(c) *Segregation.*—Unit characters, although they may be intimately associated together in the individual during the complicated process of maturation that always precedes the formation of a new individual, separate or segregate out as if independent of each other, and thus are enabled to unite into new combinations.

Of these three fundamental principles, the second, that of dominance, was the one that at first almost monopolised the attention of students of heredity, and a good exposition on the practical application of this law to agriculture appeared in the 9th volume (No. 6) of the *Agricultural Journal*. As an example of the working of this law, we may take the character of hornlessness in cattle. If we mate an Aberdeen Angus bull and, say, a Shorthorn cow, *all* the progeny will be polled. The character of " hornedness " will have disappeared or receded. That it is not *lost* the next generation will shew, for if we mate the polled animals that are the result of the first cross among themselves, we find that horned cattle once more make their appearance in the proportion to polled animals of 1 : 3. Here are the recessives again, and if these are mated among themselves they produce pure recessives only, *i.e.*, horned cattle. The dominants, *i.e.*, polled cattle, of this third generation are not all pure dominants, for, mated together, they produce one-third pure dominants and two-thirds " impure " dominants, the latter being distinguished by the fact that in their offspring recessives re-appear in the proportion of one recessive to three dominants. This is expressed schematically in Fig. 1 :—


D × R............Parent forms (P¹)
D (R)...............Hybrid offspring (F¹)
3 D
1 R.....Generation of inbred hybrids (F²)
1 D + 2 D(R)
D
3 D
1 R
R.......F³

D = Dominant.
D (R) = „ (impure).
R = Recessive.

Fig. 1.

We have, then, in hornlessness a unit character dependent on a single determiner, and apparently independent of all other unit characters. It does not matter what breed or size or shape the parent forms may be, the proportion of polled to horned offspring will be according to a simple mathematical rule.

Although this principle of dominance has been found to hold true in a surprising number of cases and in relation to very diverse organisms, yet so far as stock-breeders are concerned cattle appear to include in their consistence very few unit characters that can be predicted as simply as can hornlessness. It is now understood, indeed, that *segregation, not dominance*, is the most essential factor in the Mendelian scheme. A case of imperfect dominance is furnished by the roan colour which results when red and white cattle are crossed. If two roans are mated they produce red, roan and white offspring in the proportion of 1 : 2 : 1, thus shewing that the dominance of red is imperfect. If it were perfect, the mating of red and white would produce reds only, and these mated together would produce three reds to one white.

Infinitely more complex does the subject become when we try to reduce size, symmetry, early-maturing tendency, etc., to their component unit characters; and when we perceive the perfect blend that results from mating two distinct types, we may well be puzzled to know how to bring these cases of *blending inheritance* into line with the Mendelian law of segregation. The advance of knowledge in this direction is principally due to the Swedish investigator, Nilsson Ehle. He, working on wheat, shewed that an independent unit character may be dependent upon more than one determiner, and it is these determiners that are inherited according to Mendelian law. Hornlessness in cattle, susceptibility to rust in wheat, and round, starchy kernel in maize, are examples of unit characters dependent upon a single determiner, and give the ratio of three dominants to one recessive in the second filial (F^2) generation. The brown colour of wheat-chaff is a unit character dependent on two determiners, and gives the ratio of fifteen to one in the F^2 generation. The red colour of wheat-kernel is a unit factor dependent on three determiners, and gives the ratio of sixty-three to one.

As this is a most important discovery, perhaps I may be allowed to quote at length from Walter's "Genetics": "If a brown-chaffed wheat with the formula BB′, in which B and B′ each represent a brown-chaffed factor, is crossed with a white-chaffed wheat of the formula bb′, in which b and b′ each represent the absence of B and B′ respectively, then all the progeny of this cross will be brown-chaffed, having the zygotic formula BB′bb′. When upon maturation the gametes form out of the germ cells from such hybrids, the following four combinations are possible, and no others: BB′, Bb′, bB′, bb′. These represent, therefore, the possible gametes present in each six of the first filial generation, and upon inter-crossing they can combine into sixteen possible zygotes to form the second filial generation, as shewn in Fig. 2:—

	BB′	Bb′	bB′	bb′
BB′	BB′ BB′ 4	Bb′ BB′ 3	bB′ BB′ 3	bb′ BB′ 2
Bb′	BB′ Bb′ 3	Bb′ Bb′ 2	bB′ Bb′ 2	bb′ Bb′ 1
bB′	BB′ bB′ 3	Bb′ bB′ 2	bB′ bB′ 2	bb′ bB′ 1
bb′	BB′ bb′ 2	Bb′ bb′ 1	bB′ bb′ 1	bb′ bb′ 0

Fig. 2.

The numbers in the squares indicate how many times a brown determiner is present in each zygote. It will be seen that only one out of the sixteen possibilities lacks a brown-chaff factor, and this one will consequently produce only white chaff, while the remaining fifteen possibilities, each of which has at least a single determiner for brown, will all yield brown chaff. The brown-chaff factor, moreover, is present in varying doses among these fifteen possibilities, as indicated by the numbers in the squares. *It is evident, therefore, that several shades of brown will be represented, depending upon the number of doses of the brown determiner in each instance.*

Fig. 3 shews how these different shades of brown arrange themselves in the manner of a frequency polygon of fluctuating variation, with the greatest number in the halfway class and the least number at the two extremes. *In this instance six out of the sixteen individuals theoretically present a perfect 'blend' between the original brown and white-chaffed grandparents, although complete segregation has actually occurred.*"

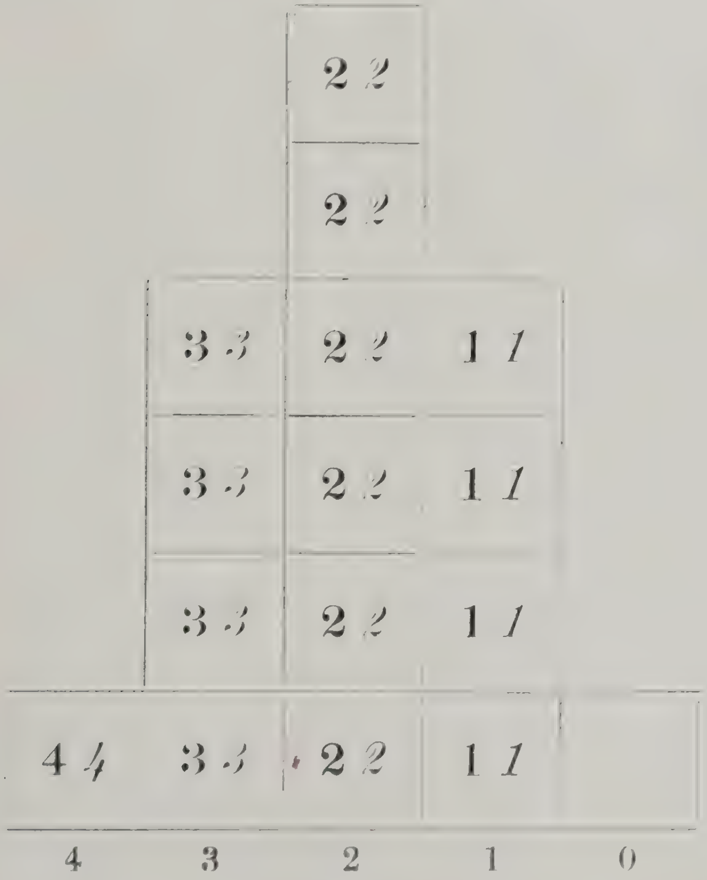


Fig. 3.

It is conceivable then that, after all, such "points" as size, milk yield, immunity to redwater, etc., may be unit characters dependent on several determiners. Let us suppose that immunity to redwater be a unit character dependent on three determiners B, B′, B″; then if a native cow possessing this character be crossed with an imported bull, in which b, b′, b″ each represent the absence of B, B′, B″ respectively, then all the progeny of this cross will have the zygotic formula BB′B″bb′b″, and will possess half the immunity possessed by their mother. When these half-breds are crossed among themselves, there will be produced offspring of which, out of every sixty-four, twenty will possess the same degree of immunity as their parents, *i.e.*, BB′B″bb′b″, twenty-one will possess a relatively greater degree of immunity, and twenty-one will possess a relatively lesser amount, while one animal will possess the full immunity of its grandmother, and one will resemble its grandfather by lacking immunity altogether.

Of course, this is a hypothetical case, but the point I want to make clear is that although a half-bred beast appears to be a blend of its parents, yet its unit characters follow the law of Mendelian segregation, and when similar half-breds are mated there will be a sorting out of these characters, and according as a character is dependent on few or many determiners, so will a large or small percentage of this second filial generation possess this character to the same degrees as did the grandparents. One last example :—Suppose a high milk yield were a unit character dependent on two determinants. We mate an imported well-bred dairy bull with a herd of Mashona cows. The half-breds would give an increased quantity of milk (BBbb). These, mated among themselves, would produce offspring of which one in every sixteen would yield as much milk (BBBB) as a cow of the same quality as the originally imported bull, four more would produce more milk (BBBb) than their parents, five would produce less, and six would produce the same amount.

Please do not misunderstand me. I do *not* say that milk yield, immunity to disease, size, symmetry, etc., *are* independent unit characters, but I say that they probably are. In that case it is possible, nay, probable, that by mating half-breds in a sufficiently large number of progeny there will be found some animals possessing large doses of desirable "grandfatherly" unit characters, together with an equally large dose of "grandmotherly" immunity to indigenous diseases. By continued selection, such a type could be fixed.

Citrus Industry in Rhodesia.

Pruning and Training.

ANOTHER DIFFERENCE OF OPINION.

By A. G. TURNER, Government Citrus Adviser.

The following contribution on the subject of pruning and training young citrus trees has been received from Col. O. Baker, Chiconga's Location, Old Umtali, and should prove of great value to all Rhodesian farmers interested in the citrus industry. I may say that this gentleman's grove was one of many that I had in view when, in the February issue of this *Journal*, I wrote the paragraph which Col. Baker quotes anent forming the shape of young orange trees. Col. Baker writes :—

" Following in the footsteps of Dr. Sketchley, I desire, in the interests of Rhodesian citrus growers, both present and future, to draw attention to another important detail of this industry whereon divergent views have found expression not only in the *Rhodesia Agricultural Journal*, but also elsewhere ; and this is the pruning and training of the young citrus tree.

" It may contribute to a clearer rendering of the following remarks on the subject if I am permitted to explain that my young citrus plantation contains two thousand Washington Navel trees, of which the first consignment of five hundred was planted out at the beginning of 1911, and the subsequent three consignments, each also consisting of five hundred trees, were planted out at the beginning of the three succeeding years. Thus the earliest trees have now been planted out four-and-a-half years, and the latest one-and-a-half. All the trees were obtained from the same nurserymen, a firm of wide and excellent reputation, whose nursery is in Cape Colony. The first three consignments consisted of small-size trees, and the last of large-size; the difference being, I believe, that the small-size trees are of one year's standing from the time of budding, and the large-size of two years'; all being raised on one-year-old rough lemon stock.

"Several trees of the first and second consignments died back to a point within a few inches of the stock after being planted out, and of the third consignment a very large number, nearly 50 per cent., behaved in a like way. But of the fourth consignment, which consisted entirely of the large-size trees, there was no dying back whatever, and every tree of the five hundred became well established in the groves. I draw attention to this circumstance because I think growers of citrus in Rhodesia would do well to profit by my experience and not plant out small-size yearling trees. This necrosis of the parent stem led to an outcrop of shoots, varying in number from two or three to a dozen, which started from close above the stock, the remainder of the original tree being dead.

"Setting aside for the present this untoward occurrence, and confining attention to the young nursery tree which retains its full vitality on being planted out, and does not die back, it is seen that the first growth which takes place consists of the breaking forth from the entire length of the young tree of numerous branches, of which the lowest usually become the thickest and strongest. How is this young tree with its new growth to be managed, in order that a well-proportioned orange tree may eventually result therefrom? For this is the point under consideration.

"The first reference to this question to be found in the *Agricultural Journal* comes from the pen of Mr. G. M. Odlum, and is to be read on page 6 of Vol. II. Mr. Odlum states, 'The citrus tree should not branch at the ground, but have two or three feet of clean trunk, permitting cultivation and spraying.'

"On page 314 of Vol. IV. Mr. McIlwaine, the pioneer of the citrus industry in Rhodesia, after pointing out that 'In some parts it is considered a good practice to preserve all the lower branches on citrus trees,' and that 'On the other hand some growers believe in an umbrella-shaped tree with a long bare stem,' goes on to say, 'The method recommended for this country consists in leaving all the branches on the main stem for the first year or so, when the want of air and sunlight is not so much marked. Thereafter, as the branches expand, those near the ground can be removed gradually until a condition is arrived at when the air circulates freely under the tree.'

"No further reference to the question appears until Vol. XI. is reached, when Mr. Farmer deals with the subject on page 537 *et seq*. His remarks are too lengthy for quotation in full, but the following extracts will, I think, adequately represent his views. He states, 'No branch of the culture of citrus fruits is quite so puzzling to the beginner as this vexed question of pruning.' 'It is no wonder that this question is sometimes settled in that most comfortable way of all, by persuading oneself that no pruning is required.' 'As the young budded tree comes from the nurseryman . . . it consists of little but a small stem with a few small twigs. As it commences to make a new root system it also sends out shoots correspondingly at intervals from the stem; these shoots may be very numerous, and even come in pairs. These should all be left on the tree, only those starting from below the union being removed. Certain ones may take the lead, and grow so quickly as to be unable to support their own weight,' when 'they may be given support by tying them to the stem.' 'These shoots will form the lateral branches of the future tree.' 'The writer does not wish to be understood to lay down a hard and fast rule that no growth whatever is to be removed at this stage . . . and exceptional trees may be benefited by the removal of some growth during the first two or three years in the grove.' 'What are commonly known as water sprouts should only be removed when they start low down on the trunk, at a level where new lateral branches are not required.' 'They are the commencement of the formation of new branches and that is the tree's method of increasing its size.'

"In the February issue of the *Journal* for the current year, on page 33, Mr. Turner states, 'A very general mistake throughout Southern Rhodesia, as far as I have seen, seems to be the idea that to obtain low-headed trees all growth should be left low down on the stem. This is quite wrong, and such treatment will give a weak straggling tree. To secure ideal low-headed trees, they must be cut back at planting to about 24 inches of trunk, from which three or four buds at the top, say in the last 6 inches, should be allowed to develop into branches, which will be the foundation of the future tree—nothing else should be allowed to grow. These three or four limbs are the leaders on which to continue building, consequently all the sap should be directed towards this framework and not allowed to run to waste in water shoots, and otherwise redundant growths or suckers. Constant watchfulness should be maintained for adventitious shoots starting out on the stem, or limbs at points where branches are not desired or required. Whenever they start out strongly they should be pinched off, or, better still, entirely removed with a sharp knife. Suckers should also be removed at once whenever discovered.'

"The foregoing extracts comprise practically all the technical information on the subject of pruning and training young orange trees that is available in the pages of the *Rhodesia Agricultural Journal*; and the divergence of views which finds expression therein is certainly very striking. But difference of opinion on this question is not confined to the leaves of the Rhodesia *Journal*, as I will proceed to shew.

"In 'Hume's Citrus Fruits and their Culture,' issued from the University of Florida, 1913, there is the following, 'Some years ago it was invariably the rule to grow high-headed trees with some four to six feet of bare trunk. Now the tendency is the other way, viz., in favour of low-headed trees with branches sweeping the ground.' 'On soils, however, which are inclined to bake and become hard it may be necessary to have the lower branches sufficiently elevated above the ground to permit of cultivation, but generally this is unnecessary.' At the same time Professor Hume points out that the young citrus trees should be cut back at planting out to eighteen or twenty-four inches, and the branches which form the strong framework of the tree should be allowed to develop from three to four buds at the top. But unfortunately he makes no reference to the treatment of the low-lying shoots which start out from the young citrus tree below the eighteen or twenty-four inches level, after it has been planted out. With regard to suckers, he writes, 'Frequently suckers spring from the large branches and shove their way through the top of the

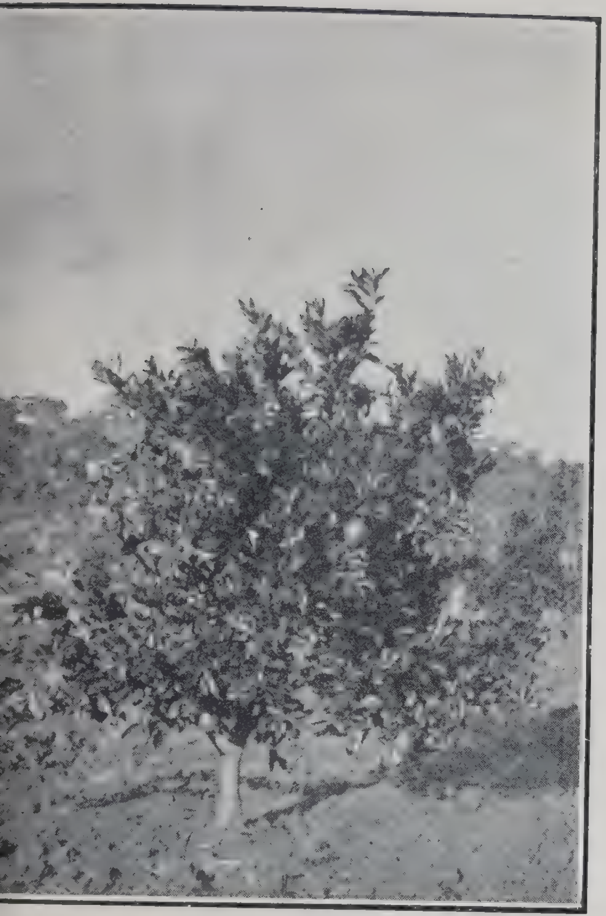


Fig. I.

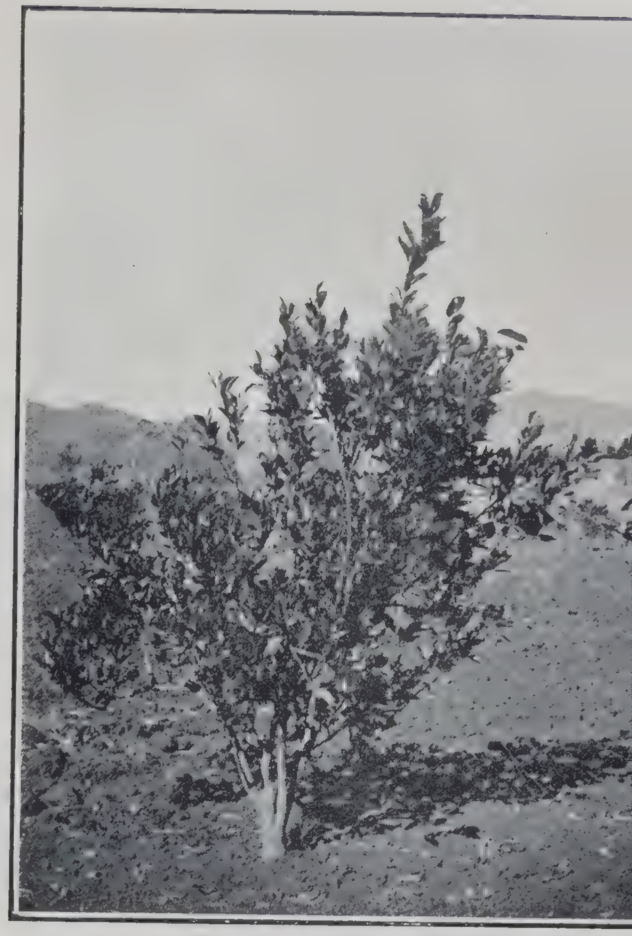


Fig. II.

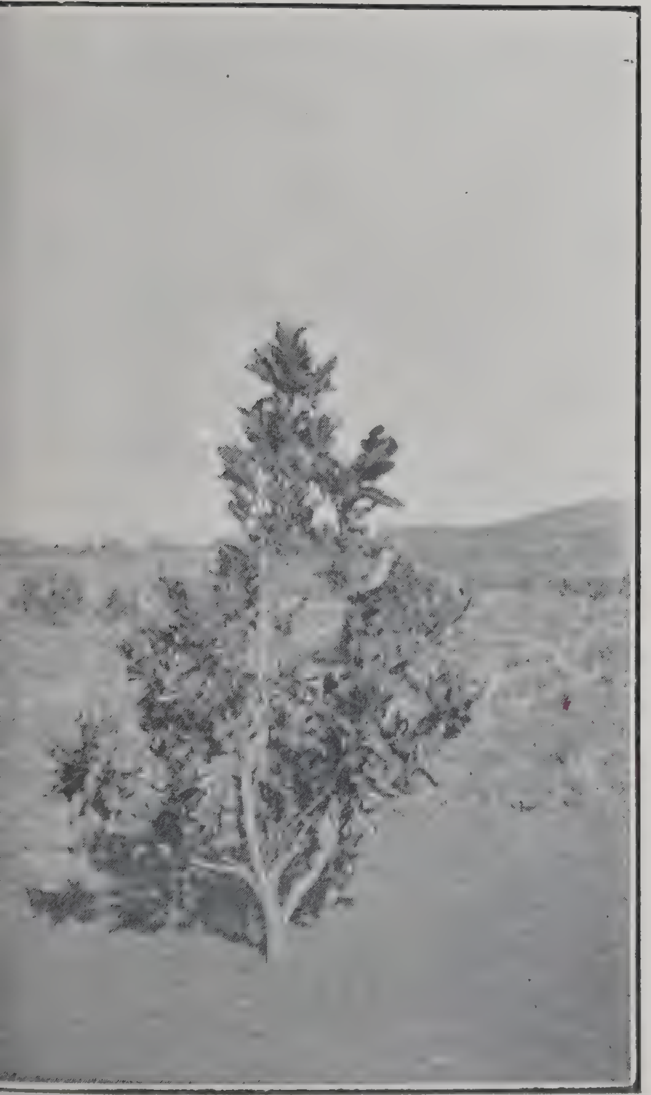


Fig. III.

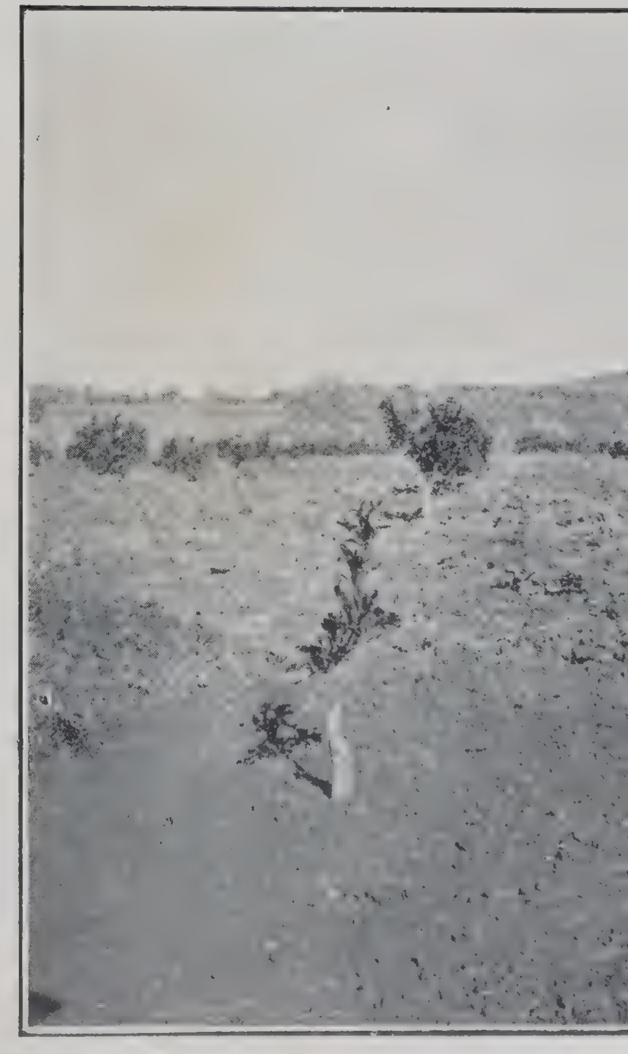


Fig. IV.

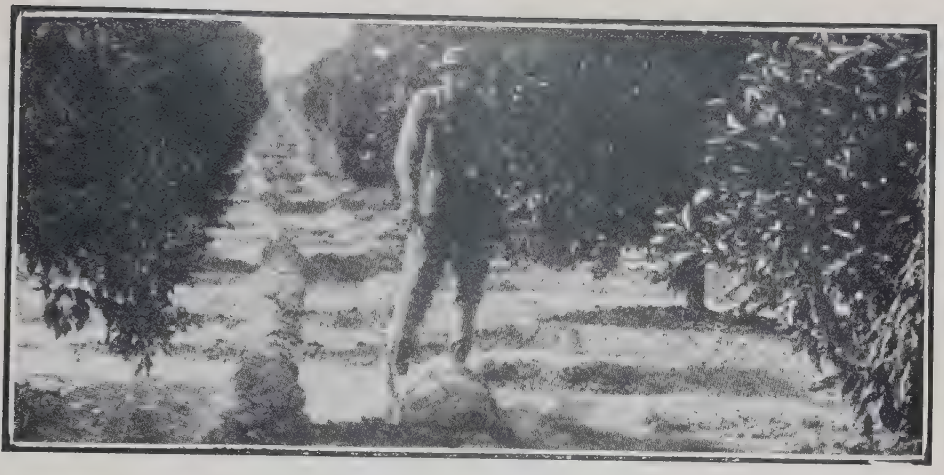


Fig. V.

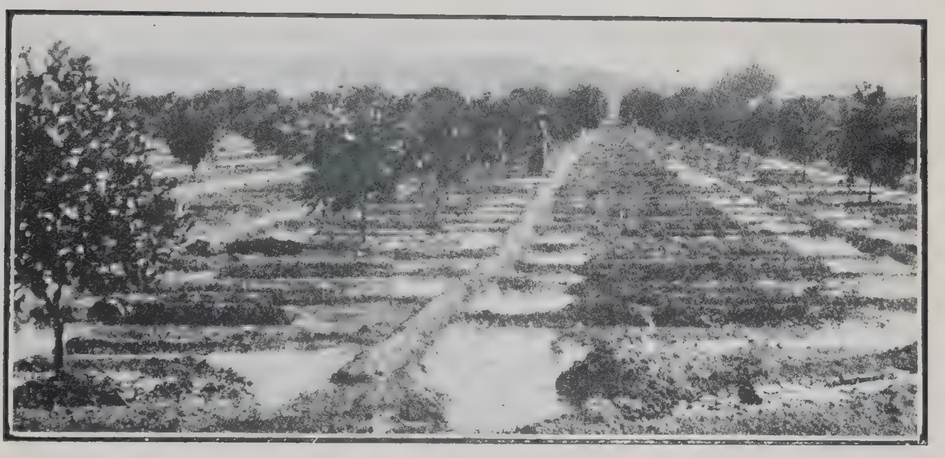


Fig. VI.

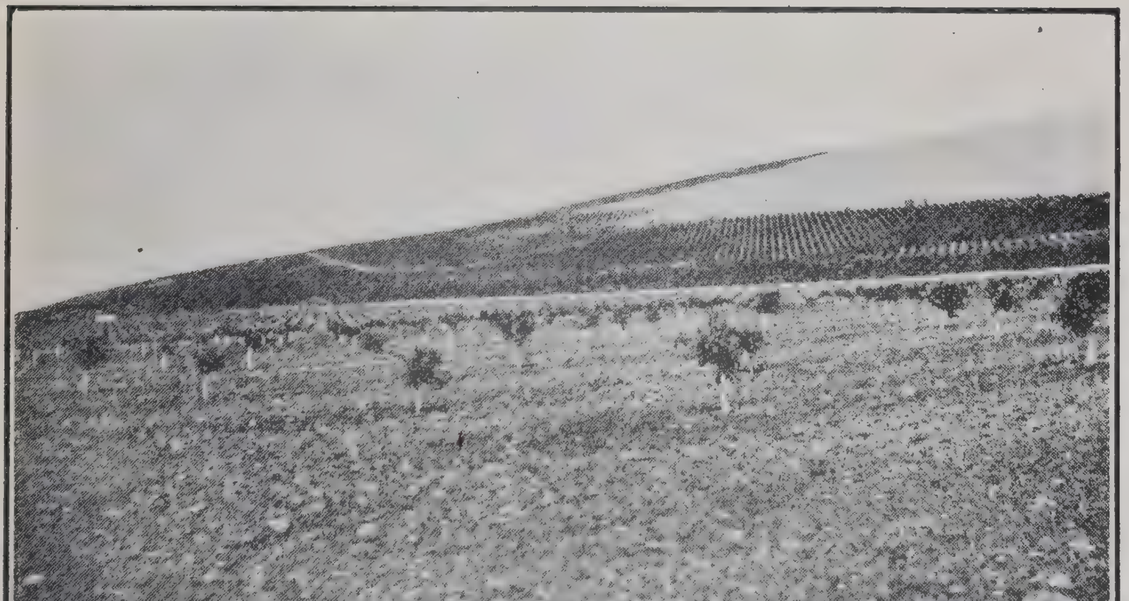


Fig. VII.

tree. Many growers remove these as soon as they appear. This is not good policy. They should be allowed to remain, for after rising above the surrounding top, they branch and bear fruit. Unless they are needed to fill out a space at the top, or if they crowd or interfere with branches already developed, they may be carefully drawn down out of the tree below the lowest branches and bent to one side, there to grow into large strong branches, thus bringing the head of the tree closer to the ground.' To give point to his recommendations, the Professor draws attention to an illustration in his book of a citrus tree with its widely-spreading branches literally lying on and sweeping the ground.

" In a work entitled, ' The California Fruits and how to Grow them,' by Professor Wickson, of the University of California, 6th edition, 1912, the author states, ' It has been held that it was necessary to prune the young (citrus) tree to quite a high head at first, to allow for the natural droop of the branches, and the result is seen in many young trees with thin stems and umbrella-like tops. It is better to develop a stout stem by allowing for a time a low growth upon it and then raise it later by removal of the lower growth which has done good service and outlived its usefulness. By wise underpruning it is possible not only to secure a shapely and convenient tree, but also so to train the lower growth that it shall present good low-bearing wood, without grovelling in the dust.' ' At about from two to three years after planting in the orchard, the removal of the lower branches begins, as they have served their purpose in shading the trunk and bearing the first fruit. These branches are removed one by one until, when the tree is five years old in the orchard, it has lost all branches below the two-foot line.'

" Under ' Later Pruning of the Orange,' Professor Wickson says, ' Gourmand shoots and suckers* should be repressed, unless by clipping, one can be turned into a branch where a branch is needed.'

" In some remarks under the heading ' Building Down and not Sagging Down,' Wickson, seemingly with approval, draws attention to the practice of a Mr. Reed, of Riverside, who 'rubs off promptly all (young shoots) below a point two feet above the ground, if there is a prospect of getting sufficient good branches above that point. If not, he saves them down to eight or even twelve inches lower if need be. Mr. Reed's idea is to build the head along a considerable length of the trunk and not have the branches bunched at the top.'

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* The terms "water sprouts," "shoots" and "suckers" appear to be used indifferently, and presumably are synonymous.

"With regard to the drooping habit of low-lying branches, Mr. Reed, as quoted by Wickson, says, 'If the tips of these rapidly-growing branches with their heavy leaves be clipped at the right time, the branches will spring back to the erect position, where they will remain to send out new branchlets. It is wonderful how the orange tree can be moulded like a thing of wax by pinching and clipping here and there, if done at the right time.'

"These quotations from the works of Hume and Wickson, possibly the two foremost living exponents of the principles of citrus culture, are perhaps sufficient to prove my contention that no one practice of pruning and training young citrus trees is universally followed. And in this connection it may be interesting to note that these authors have acquired their respective views in different localities, to wit, Professor Hume in Florida, and Professor Wickson in California.

"I think I am right in stating that Mr. Farmer's experience was gained in Florida, and Mr. Turner's in California, although the latter gentleman also possesses the desirable advantage of extensive experience of South African methods, which gives great weight to his recommendations. Mr. Farmer would appear to be, in a large measure, a disciple of Hume, and Mr. Turner of Wickson, which, if such really be the case, is sufficient to explain their conflicting views.

"With this review of the literature referred to, the path is perhaps cleared for the practical consideration of the lessons it contains.

"The only contributions I can make to the subject are limited to the results of my own untrained observations. Figs. I. and II. represent two trees now four-and-a-half years orchard-old, of my first consignment, left entirely to themselves for three-and-a-half years. No pruning knife approached them until last year, when tree Fig. I. was lightly dealt with.

" Not much knowledge is required to determine that tree Fig. II. is an undesirable specimen. These figures illustrate the policy of letting young citrus trees grow as they please. One is a fairly good tree, while the other is not even what Mr. Turner would humorously call an ornamental bush, and is a disgrace to any orchard.

" Whether the young nursery tree, after being planted out in Rhodesia, should ever be suffered to develop branches below the two-foot or eighteen-inch line is a question to which further consideration may perhaps be profitably given. It seems possible that readers of these remarks may think that the last word on this important matter has not yet been said.

" If all these lowermost branches are to be sacrificed, it is, I consider, unwise policy to defer the removal of them in Rhodesia for so long a period as that recommended by Wickson. These low-lying laterals at times grow so exuberantly that they often approach and occasionally exceed in size the parent stem; they appear to flourish at the expense of the latter, which is not infrequently dwarfed. Instead of assisting to develop a stout stem, as is the case in California, they would seem, in some instances, to retard this result in Rhodesia.

" Figs. III. and IV., which are pictures of one tree, one of my third consignment, now two-and-a-half years of orchard-age, illustrate this point very clearly. Indeed, in this case, the growth of the parent tree has been almost completely arrested.

" I am unable to see how citrus trees, be they young or old, with branches lying on the ground, 'grovelling in the dust,' as Professor Wickson puts it, can be effectually sprayed, and for this reason alone I cannot help thinking that in countries where scale and fungi are such prevalent pests as is the case in Rhodesia, the practice of growing such trees stands condemned.

" With regard to the treatment of young trees which have died back to within an inch or so of the stock, and have thrown out numerous slender shoots, a good procedure seems to be to select for the future tree the most vigorous of the bunch, which should be staked in an upright position, and cut away the remainder. But without doubt the best plan is to eschew altogether very young nursery trees. What should be done with trees such as that shewn in Fig. II. is a problem for which I am still seeking a solution.

"Although the cultivation of citrus in Rhodesia may be said to be still in its infancy, sufficient has been accomplished experimentally to shew that fruit of the finest quality can be locally produced, but the precise conditions under which an abundant harvest of payable fruit can be constantly secured have not yet been fully made out.

"In the belief that any contribution, however insignificant, likely to advance our knowledge of the subject will be welcomed, I make bold to submit these remarks."

Replying to the various points raised in Col. Baker's letter, I think the query as to how the young tree should be managed from time of planting in the orchard is really covered by the extract from my article in February, 1915, issue, given by Col. Baker.

Mr. Farmer's method of raising orange trees, to which Col. Baker refers, does not apply to this country. It is a method which was and, I believe, is still used in Florida under conditions very dissimilar to those of Rhodesia and South Africa generally, as a preventive against total annihilation by frost; that is to say, by leaving a multiplicity of growths, there would be a chance of saving something from the wreck. But in the districts of this Territory which are suitable for citrus culture, where the growth is very much more vigorous, and consequently a bearing tree is formed earlier than in Florida, there is no reason why we should waste the energy of the root system in raising a lot of useless and entirely unnecessary branches, which are bound to be cut away sooner or later.

With regard to growth being left to protect the trunk from sunburn, this can be done effectively by white-washing the stems, or wrapping with paper or hessian, until the top forms the protection. The object to be aimed at is to throw all the strength possible into the permanent head, and so form a strong tree that is convenient from every point of view.

Trees such as those shewn at Figs. II. and III. are the usual shape when left entirely to themselves, absolutely useless shrubs, which, if they bore a heavy load of fruit, would be lying right down on the ground, and the centres of the trees exposed to the fierce rays of the sun, a condition which is most detrimental to an orange tree. It is true that a seedling will make a fairly good symmetrical tree left to itself, but we are considering a budded tree, a purely artificial growth, and not a natural tree. I well remember making the remark, when going through Col. Baker's groves, that most of his trees would not even make ornamental shrubs. He has now found it necessary to cut away in many cases two-thirds or three-quarters of the growth of his trees, thus sacrificing three or four years' growth, which might just as well have been directed properly towards forming a strong useful tree that could be handled successfully for all operations.

I will admit that my first experiences of Rhodesian citrus orchards were a decided shock to me, but I am glad to find in going around the country that there is a general tendency now towards improvement.

In conversation with Mr. McIlwaine, on the subject of his article referred to by Col. Baker, he informed me that he did not intend to convey the impression that all growth should be left. As a matter of actual practice, he distinctly told me that he has never got away from the single stem tree, and this is very well illustrated by the trees, now five years old, planted by him at the quondam Mazoe Citrus Syndicate, now part of the British South Africa Company's Mazoe Citrus Estates, some 2,000 trees, which are as fine specimens of well grown trees as can be found in South Africa. All growth on these trees was suppressed below the point where the formation of the head commenced about 2 feet 6 inches from the ground level. These trees are now capable of holding up a full crop of fruit without trailing their branches on the ground; the fruit can be conveniently picked; the cultivator can work close up to them, and they can be thoroughly sprayed.

Hume's remarks about developing the orange tree from three or four buds at the top of a trunk 2 feet 6 inches high are well amplified by the accompanying three illustrations, Figs. V. and VI., taken from his work from which Col. Baker quotes, and Fig. VII., taken from a bulletin issued by the Californian Experiment Station, and they go to shew that his meaning is identical with my contention that in localities really suitable to citrus culture a clean stem is maintained.

In the same chapter Hume writes : " *Pruning in Relation to Die-back.*—In Florida it has frequently been observed that die-back follows the freezing back of the tops of citrus trees. The roots, as a rule, remain uninjured, and large amounts of materials in solution are collected. The enzyme producing die-back enters the trunk in large quantities, and the disease becomes manifest. Exactly the same condition may result from severe pruning of the tops. For this reason so much care must be exercised that the advice is so often given, ' Keep the pruning shears away from the trees and let them develop as they will,' advice which it is best for the Florida grower to follow as a general rule."

In the citrus districts of Rhodesia we need not fear such disastrous effects from frosts, although we may and do get sufficient to nip off the young sappy growths, but the damage from freezes spoken of by Hume is not likely to occur here, except in districts quite unsuited for citrus culture.

My remarks regarding pruning, on page 320 of June, 1915, issue of this *Journal*, read as follows :—" All dead wood should be removed at pruning time, as should water shoots, although sometimes one can make use of some of these to take the place of broken or misplaced branches, when they should be cut back and trained in the direction required." This is not in conflict with either Hume or Wickson.

Wickson's advice to allow a low growth below the head in order to develop a stout stem does not hold good in this country, where our growth is so exuberant ; in this respect it must be borne in mind that our wet season coincides with the growing period of the tree, while in California the rains occur during the winter months. And I would say, further, that in the latter country the practice of leaving low down growth is not usual in up-to-date commercial plantings.

It must not be thought anyhow for a minute that Wickson suggests that any *strong* growths should be allowed to grow below the head; the shoots he speaks of as being sometimes allowed to grow in order to develop a stout stem are growths not drawing much sap and may produce early fruits. A modification of this method is sometimes pursued, the shoots desired to form the head being allowed to make their full growth without interference. All shoots not desired for branches are pinched off after growing out two or three inches, leaving a bunch of leaves to shade the trunk and contribute to its stouter growth. Constant watchfulness is necessary to pinch off undesirable branches for the first few growing seasons, *i.e.*, strong shoots that would, if allowed to grow, sap the vitality of the permanent head of the tree.

Col. Baker's remarks about young trees that have died back to within an inch or so of the union of scion and stock are on the right lines; the most vigorous shoot that pushes out above the union should be chosen, and all other growths suppressed. This strong growth should be staked and allowed to grow to a height of between 3 feet and 2 feet 6 inches, and the head formed from the best placed growths in the top six or eight inches, in order to make a well balanced tree, all growths below the lowest branch to be suppressed. It is certainly not a good policy to have the head bunched up right at the top of the stem, but I would say that it is impossible to lay down a hard and fast rule as to whether the head is formed in the top six or even twelve inches. The grower must use his own common sense in this respect; the ideal he must keep in view being a well-balanced, convenient and strong tree, allowing no waste of energy in undesirable growths. If this is adhered to in the first two or three years from time of planting in the grove, the pruning in after years will be a small matter, merely a thinning out to prevent the tree from being too dense a mass of foliage.

Growers buying young trees from nurserymen should demand a well-grown tree, of at least two years' growth from bud, and refuse to accept delivery of such sappy growths as Col. Baker apparently had sent him among his first three consignments.

Contagious Abortion of Cattle.

By J. M. SINCLAIR, M.R.C.V.S., Chief Veterinary Surgeon.

About three years ago the various farmers' associations in this country were circularised on the subject of abortion in cattle, with the request that any cases should be brought to the notice of the Department. Only two positive replies were received—one which referred to donkey mares, the other to two cows which could not then be traced: In his last annual report the Government Veterinary Bacteriologist states as follows :— "From time to time during the last ten years cases of abortion have been reported to the Veterinary Department, and these have occurred at certain periods of the year, generally about the time of burning the veld, but as the agglutination test has only recently been applied for the detection of this disease, positive proof of the *specific* nature of these outbreaks has not hitherto been possible." With the exception of a large number of cases of abortion which occurred in a herd in Marandellas district in 1909, which were not reported to the Veterinary Department until some time after their occurrence, there have been no cases or series of cases known to the Department at any time during the last ten years which have aroused suspicion of the existence of the *specific* infection. The writer has frequently expressed his satisfaction that this bovine scourge did not exist in Rhodesia. It is interesting to recall, however, that in 1911 he expressed this view to one of the greatest European authorities on abortion, and was told not to be too sure ; there are very few cattle countries free from it.

An article on this disease by the Government Veterinary Bacteriologist appeared in the *Agricultural Journal* for October, 1910. (Reprints of same can be had from the Editor.) It is unnecessary, therefore, to discuss it here, but there is one point on which several enquiries have recently been received, viz., Is bovine abortion transmissible to sheep, goats or mares? "It is true that practically all the domestic species can be

Bulawayo Waterworks Dam, in course of enlargement.

experimentally infected with bovine abortion, but it is also correct to say that bovine abortion under natural conditions of infection is almost entirely confined to the bovine species."* The significance of this statement is more fully realised having regard to the fact that bovine, ovine and equine abortion are caused by different micro-organisms.

In October last year two centres of infection of contagious abortion in cattle were discovered in Southern Rhodesia—one in Marandellas district; the other in Lomagundi district, amongst a herd imported from Northern Rhodesia a short time previously. In the latter case the herd had been in quarantine from date of arrival; no animals had been distributed from it. The infection in the Marandellas case was therefore not due to it. Since then, other centres have been discovered in the two districts referred to, and also in Mazoe district. As various farmers' associations throughout the country have manifested considerable uneasiness in regard to the disease, both by correspondence with the Department and through the reports of their meetings which have appeared in the Press, it is thought desirable to convey some information as to the progress of the disease in the infected herds. This can be done in a few words:—In every infected herd, some of which are of considerable size, only a few cases have occurred; in no instance does the number of known abortions exceed 5 per cent. Enquiries and observation on the subject are still being prosecuted, but it is too early to arrive at any definite conclusion on the subject. With the evidence at his disposal, however, the writer offers the following opinion, which may or may not prove correct:—Contagious abortion is not a recent introduction into Rhodesia; it has existed for many years, but in such a mild form that it has escaped detection. If such is the case, it is scarcely possible for it to assume the economic importance which it holds in other countries.

It is of the utmost importance that the existence of the disease in this Territory should be thoroughly investigated. It is hoped, therefore, that particulars even of solitary cases will be at once reported to the Veterinary Department for investigation.

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* Stockman's Report on Epizootic Abortion to the Tenth International Veterinary Conference.

Poultry Keeping for the Rhodesian Farmer.

By Frank Sheppard.

Now that the early hatched pullets are reaching maturity, they should be turned out on to free range, and in no way encouraged to loaf round the homestead looking for tit-bits thrown out by the kitchen boy. A few will be lost through vermin no doubt, but the general health of the birds and the saving in the food bill will most probably compensate the owner for any losses.

Although I hear rumours of great losses through vermin amongst poultry in Rhodesia, they are only exceptional cases, and the losses of the majority of poultry keepers are very little greater than those in other countries.

On whatever system we keep our birds, or whether we are back-yarders, plot-holders or free-rangers, we shall lose a few birds annually. Even birds in laying competitions are not safe. I notice the birds in the Panama-Pacific laying contest now being held are housed in skunk-proof houses, and in the contest held at the Harper Adams Agricultural College, Newport, Salop, in 1912-13, out of thirty birds which either died or were killed, stoats accounted for two. Penning birds in either large or small runs close to the homestead or at a distance is not any safeguard against hawks, unless, of course, the runs are wired on top. I have not tried the plan of stretching wires across the top of the pens, and have never seen it done. My own experience, and also that of many poultry keepers to whom I have spoken, points out that the safest place for our birds when hawks are numerous is thick bush. Two instances recently came to my notice; one where a flock of fifty-two half-grown youngsters running on open ground close to the homestead has now decreased to fourteen; the other where a large flock of layers, also young stock, is run on a gum plantation, there are no losses through hawks.

The town and suburban poultry keeper has dogs, cats and rats to contend with, and, worst of all, fowl thieves. We also hear of exceptional losses occasionally amongst the town dwellers' poultry. For instance, the escaped ferret, which got amongst the stock of a well-known breeder of bantams in the north of England, and in a single night killed every bird.

Those of us residing a few miles out of town have practically the same vermin to contend with as the outside farmer, only in a less degree. Jackals, wild cats of various kinds, hawks and snakes are our worst enemies. During the day it is difficult to guard against the wild cats when birds are running on free range, and although these pests are hardly ever seen, small bunches of feathers here and there shew us that they pay periodical visits to our birds. At night, when they are more active, proper housing, not grass huts, is the chief safeguard.

The employment of a picannin to drive away hawks during the day I found useless when birds are on free range and spread over a large area. Now, as regards the hawks, I let the birds take their chance, but make use of as much thick bush as possible.

There are some districts, no doubt, where vermin are more troublesome than in the Salisbury district, but my vermin register, which now totals upwards of seventy cats, hawks and snakes killed in two-and-a-half years, shews that we are not entirely free, and had I been armed with a gun instead of the food bucket and water-can on my daily rounds of the birds, this number would be easily doubled. My losses include a brooder, which had not been properly closed, of fifty-two chicks killed by something in one night, and the recent visits of a tame cat gone wild to a large chicken run which accounted for over thirty birds before the trespasser was seen and shot. These will shew that even where every precaution is taken, and a night watchman with dogs is employed, it will be difficult to reduce the percentage of losses through vermin to nil.

A great proportion of the losses through vermin is owing to improper housing, which can easily be avoided. Birds will be safer perching in trees than housed in grass or other useless houses when vermin are troublesome at night. And, again, as every experienced poultry keeper will agree, it is far more satisfactory and cheaper in the long run to make a good serviceable house at the outset, one that will last ten years or more, and will not require continual spraying and attention, than to construct a draughty, leaky, damp concern which is not fit for the housing of any kind of live stock.

We are unable to prevent a certain number of our birds being killed annually through vermin, but we are able greatly to decrease the percentage which die, or perhaps I should say are killed through improper housing, inattention and improper feeding.

When poultry are taken seriously, and owing to thieves, wild cats and jackals, many are lost during the night, by far the best safeguard is the employment of a night watch boy, who must realise that he is entirely responsible for the safety of all the stock. After having birds stolen from a locked-up colony house, the wire being torn off the front, I decided to have a night watch boy. The number of wild cats caught with the help of dogs and the capture on different occasions of five natives trespassing on the farm shew that the extra precaution is not useless.

There is work other than the guarding of the birds to be done after dark, which is usually resented by natives who have been working during the day. The cooking of the birds' food for the following day, shutting ventilators and fixing storm blinds if the rain is driving into the houses, assisting in shutting up and opening out the houses in the morning, ringing and toe-punching the birds, all form part of a night boy's work. If some small remuneration is given for all vermin caught or arrests made, there need be no fear of the birds' safety during the night.

At this time of the year, when our birds are in full lay, many poultry keepers have a surplus of eggs which is often wasted. There are several excellent preservatives, and in view of the scarcity during the early months of the year, all surplus eggs should be preserved, even if only a few hundred for domestic use.

There are two or three essential points which must be noted with regard to the preserving of eggs, whatever method is used. The nests must be clean. The eggs must be clean and collected daily, or if possible twice each day in this climate. They must be placed in the preservative quite fresh. All eggs the age of which is at all doubtful must be candled. This is quite simple. A piece of cardboard, in which is cut a small hole slightly smaller than an average size egg, should be held against a lamp or candle. If, on holding the doubtful egg against the hole, a cloudy appearance is noticed and a large air space at the broad end, then the egg must not be placed in the preservative; but if there is practically no air space and a clear appearance, then the egg may safely be used.

If possible only unfertile eggs should be used, and any that are cracked or thin shelled must be discarded. Earthenware vessels should be used, and placed in a cool position.

There are many different methods of preserving eggs—the most satisfactory being in waterglass (silicate of soda) and lime. The method of preserving eggs in waterglass, which by the way was first discovered by the German agricultural schools, was described in the August number of the *Agricultural Journal.* The use of lime as a preservative is cheaper than waterglass, and almost as satisfactory. The lime should be thoroughly slaked in water and allowed to settle, then well stirred and allowed to settle two or three times. The clear liquid is then poured over the eggs. One pound of lime will make enough solution to preserve about fifteen dozen eggs. The eggs should be three or four inches below the surface of the lime water.

Most of us know that a large bucket will hold two hundred eggs, but as a guide to the size of the preserving vessel to be used I give the following list taken from Bulletin No. 54 of the Washington State Agricultural Experiment Station :—

Contains.	Holds.	Solution required.
1 gallon	40 eggs	3 pints 10 ozs.
2 gallons	80 eggs	7 pints 3 ozs.
3 gallons	120 eggs	10 pints 13 ozs.
4 gallons	160 eggs	14 pints 6 ozs.
5 gallons	200 eggs	18 pints
10 gallons	400 eggs	36 pints

With regard to the housing of growing stock on the edge of cultivated land, I find that as soon as the ploughing is finished the birds are never to be seen on the open ground. While ploughing was being carried out the birds spent a great deal of time on the freshly turned ground close to their house, but now spend the whole day in the bush. When the crops are well grown these birds will again be seen ranging on the land, when there will be a certain amount of shade and cover.

Breeders of sitting varieties of fowls are now greatly troubled with broodiness, and if the birds are not wanted for sitting purposes, they should be dealt with at once. The usual method of placing a bird in a broody coop provided with bars on the bottom instead of a floor is well known to all of us, but this frequently results in the loss of the laying condition of the bird. In the recent laying competition held at Sedlescombe, Sussex, the method of dealing with broodies, which was described in the report of the contest, differed from the usual one of close confinement in a broody coop. An ordinary cockerel house was placed in a small wire run, the wooden floor being on the ground, but the body of the house was raised on legs, leaving an open space of 12 inches all round, which was filled in with wire netting. Perches were provided, but, of course, no nests. It was found that the broodies very soon tired of sitting in the draught on the hard floor of the house, and either sought the perch or took exercise in the run. This treatment was most effective in quickly breaking the birds of breeding inclinations, and, as they maintained condition, they were in the majority of cases laying again in five to ten days.

All our young stock must be kept steadily growing. Good housing, good feeding and advantage taken of every hour of daylight will accomplish this. Chickens are early risers, and must be liberated, watered and fed as soon as possible in the morning. The growing youngsters, especially those which have not yet reached the perching stage, must be provided with dry sleeping quarters where there is no likelihood of the rain driving in and damping the litter. The noxious fumes which arise from damp litter and manure will affect the health of the birds, and a few cases of cramp and rheumatism will probably be found.

Now that the new grass is shooting, a less quantity of green food may be given, but it should not be entirely omitted, as, if grass is eaten to excess, it is liable to cause crop-binding.

We frequently see amongst flocks of chicks many wasters which, even if they reach maturity, will never become profitable layers. From the very start of the hatching season there should be a continual weeding out of the wasters. Two or three dozen well developed forward birds will turn out more profitable than twice the number of pale-faced, scraggy, backward birds, which will make very poor development during the wet season.

Now that the nights are becoming warmer, care must be taken that the sleeping quarters of the growing birds are large and airy, as, if the birds become heated through bad ventilation and overcrowding, there is sure to be trouble with disease. Finely chopped onions in the soft food will assist in keeping the birds healthy and free from colds, which are often prevalent at this season.

If the young stock are not fully matured, they should not yet be allowed to run with the adults; they will be crowded out at feeding time, and many will probably be injured either accidentally or through jealousy.

I sincerely hope the early hatched cockerels are not still running with the pullets; they should have been separated months ago, and now that they are well developed, the selection should be made for next year's stock birds and those for market, the latter being penned up. If there is much fighting amongst the cockerels, the introduction of a vigorous cock bird into the flock will soon put an end to that trouble. Any of the market birds which shew signs of making first-rate table birds, and are intended for the Christmas fat stock shows, should be carefully watched as they mature, and their preparation as table birds must not be kept till the last minute.

In Rhodesia, when our table poultry are exhibited alive, it is difficult to judge exactly in accordance with the standard, which gives 25 points for size and quality: 30 points for youth, quality and quantity of breast meat; 25 points for straightness of keel, fineness of bone, absence of offal and surplus fat, and 20 points for general marketable appearance, colour of skin, etc. These particulars will give the exhibitor some idea what is required of a table bird, and if the standard is taken into account when selecting and preparing a bird for exhibition, it will have a good chance of success.

The birds selected for fattening for exhibition should be large, deep bodied, and of a quiet disposition. Fighters and feather eaters will not respond to the fattening treatment. The birds should be penned together, not singly. Three weeks before they are intended for exhibition they should be penned up. If starved for 24 hours in their fresh quarters, they will readily eat a full meal of their new food. For the first week they should be trough-fed, and after that they should be fed by hand. The hand feeding, although rather tedious, is the most satisfactory way of cramming, and is quite possible when only a few birds are penned up.

Owing to the strange situation, the birds will perhaps lose a few ounces in weight the first week, but will make it up the second, when the greatest increase in weight will take place.

After feeding from troughs for the first week, the hand cramming method should be adopted. The birds should be held between the knees. The food should be made into pellets about one inch long and three-eighths of an inch thick, then dipped in milk and forced down the throat by the finger. The bird's neck should be stretched well out and the pellet pressed down into the crop by running the finger and thumb down the neck behind the pellet. Hand-cramming should be continued for the second and third weeks. Few birds will stand fattening for a longer period than three weeks, and to do this they must be healthy at the start, and not already possessing a great quantity of yellow fat, as is the case with so many of our Rhodesian birds of heavy breeds.

As I have not experimented yet in Rhodesia on a large scale as to the best fattening diet to be made from our local foods, it is impossible to give any definite information. Mealie meal should only be used in small quantities, as it creates a yellow fat, which is undesirable in table birds. Buckwheat meal, mashed potatoes and skim milk are well worth a trial.

As most of the usual dusting places of our birds are in an exposed position, and will soon become useless owing to the rain, fresh dust baths should be provided. The use of wood ash for dusting in is condemned by some poultry keepers, as it is supposed to irritate the skin, but I have not found this to be the case. A mixture of road dust, ashes and a little insect powder or powdered sulphur is probably the best dusting material, but as our road dust is usually sand, it is little use. A box with low sides containing dry wood ash and a little insect powder or powdered sulphur should be provided in a sheltered position, where the birds may cleanse themselves. As the use of a dust bath is the only means our birds have of ridding themselves of vermin, it is most important that a dusting place should be provided during the wet season, and especially while the birds are moulting.

Do not force the early hatched pullets on to lay. Eggs are not wanted now.

A change of situation will be found a great help to young stock which does not appear to be developing as rapidly as it should. Do not over-crowd now the nights are getting warmer. Three or four months' old birds of light breeds can now be provided with perches, but heavy breeds should not be allowed to perch till five or six months old.

The treatment and marketing of eggs in Rhodesia is a subject we hope to deal with fully at some future date, but at the present time, when large quantities of eggs are being marketed, a few words on this matter will not be out of place. In this climate eggs should be despatched to market absolutely fresh. The eggs should be gathered daily, and stored in a cool, slightly damp place. It does not need a hen to start incubation in this climate. An egg which has lain out in the sun for a few hours shews the blood rings and has a cloudy appearance. These should not be marketed. Any doubtful eggs should be candled. As an egg readily absorbs odours, the nests must be clean, also the place where they are stored. The eggs must be clean, and, if possible, graded. One bad egg in a large consignment shews that the methods of the producer are not satisfactory.

In an article which appeared in the "Reliable Poultry Journal" recently, we read that the American farmers lose annually 45 million dollars (£9,000,000) through bad methods in producing and marketing eggs. When we realise what can be lost in a country where poultry has reached such a high standard, and when the value of eggs produced in one year is greater than the value of all the gold produced in South Africa, it gives us some idea what is lost to the poultry keepers of Rhodesia, where the production of eggs only amounts to a few thousand.

Although poultry can hardly be considered to be taken seriously in this country up to the present, I feel sure that the time is not far off when poultry keepers will realise that with its advantages and disadvantages Rhodesia is one of the finest countries in the world for utility birds. Our greatest disadvantage is the lack of wheat and oats. Our greatest advantage is the ideal weather from April to September, during the hatching and rearing season. When we look at the conditions under which these two phases of poultry keeping are carried out in other countries, we shall have difficulty in finding a better climate than our own. Our birds are not subject to diseases similar to those which cause the highest rate of mortality amongst cattle and horses, against which the veterinary and bacteriological experts are continually fighting. With ordinary care and commonsense treatment our birds are as healthy as those of any of the great poultry-breeding countries of the world, and the high death-rate amongst the birds in Rhodesia is not due to the country, to the climate or to vermin, but to bad management, bad housing, wrong feeding, and last, but not least, wrong system of feeding.

Sunheat *v.* Weevils.

PRELIMINARY EXPERIMENTS.

By R. Lowe Thompson, B.A., F.R.G.S.,
Assistant Government Entomologist.

The importance of the rice weevil (*Calandra oryzæ*) as a pest of maize, wheat, rice, barley, etc., may be estimated from the fact that in a recent count 1 lb. of infested wheat contained 561 Calandra, but only 39 specimens of other species of grain-eating beetles, and 40 of other beetles of doubtful economic importance. This insect may be described as a rather elongated, very dark brown or nearly black beetle about one-eighth of an inch in length, and may be distinguished from other grain pests by the fact that the head is prolonged into a curved slender beak. It occasionally attacks maize in the field, but is most destructive in the seed store, where our climate allows it to breed without interruption throughout the year. The eggs are laid in the seed, and both the maggot and the pupal stages passed inside a single seed. The duration of the different stages has not been worked out in Rhodesia, but Messrs. Hinds & Turner, from observations made in Alabama at a mean temperature of 60 to 65, give the average periods as follows:—Eggs 3 days, maggots 17 days, pupa 6 days.

The orthodox remedy is fumigation with carbon bisulphide, and details of this method are given in the *Rhodesia Agricultural Journal* for August, 1911, but this process has certain disadvantages, such as the local price of the chemical employed, the fact that since the eggs are resistant to the fumes several fumigations may be necessary, and that the fumigation should be carried out under air-tight conditions.

An alternative remedy is the employment of artificial heat, and Prof. G. Dean, writing in the "U.S.A. Journal of Economic Entomology" for April, 1911, states that adults of the rice weevil die at a temperature of 118 degs. F., while in a later issue (February, 1913) of the same publication he adds that rice weevils cannot stand a temperature of 119 degs. F. for more than two or three minutes.

As far as the writer is aware, no attempts have been made to ascertain whether *natural* heat might not be employed against this pest, but local conditions suggested this possibility. Accordingly, a bucksail was spread out at the Experiment Station, Salisbury, on a level stretch of soil fully exposed to the sun. A thermometer was placed upon the sail, the sun temperatures noted from time to time, and the following experiments were made :—

Experiment 1.—14th April, 1 p.m.—Temperature on sail 116 degs. F. A sample of heavily-infested wheat was taken from the laboratory and divided into two parts, one part being sealed up in a glass jar, the other swept out thinly on to the sail, so that each grain and the weevils were fully exposed to the sun. On touching the hot sail, the weevils first exhibited a wild surprise, a few flew away, the rest died in ten minutes. At 3 p.m. the sunned wheat was sealed up in a jar and placed in the laboratory next the untreated sample. Both jars were watched, and whereas in the untreated seed weevils continued to breed in large numbers, and had by September entirely consumed the wheat, leaving only a caked fetid mass of dead weevils and dust, no weevils or insects of any kind appeared in the sunned seed. It appears, therefore, that the exposure had killed the weevils in all stages.

Experiment 2.—15th April.—The above experiment was repeated, but the temperature only rose to 106 degs. F. and only a few weevils died.

Experiment 3.—15th May, 11.30 a.m.—Temperature 115 degs. F. Infested maize was scattered thinly on the sail. At 12.45 p.m. (temp. 113 degs. F.) only three weevils were alive, and these had either died or escaped by 1.30 p.m. The maize was then placed in a jar, in which no weevils had appeared by September.

Experiment 4.—24th September.—Two samples of infested wheat were exposed at 115 degs. F., one sample being scattered thinly as before, the other allowed to lie in a layer half-an-inch deep. The weevils in the first sample died in a few minutes, some that were thrown on the sail without any wheat perishing in three or four seconds. In the second sample the weevils first came to the surface and endeavoured to escape, but as the sail cooled through contact with the grain, they burrowed down to the sail, and, availing themselves of a shade temperature, survived.

The following points suggest themselves in connection with the above experiments :—

1. The seed should be swept out so that it lies in a single layer only. If heaps occur, weevils may hide in the shade and survive.

2. The fatal temperatures observed are slightly lower than those given by Prof. Dean, and the action of the heat more rapid. One may attribute this to the fact that the seed used was taken from a comparatively cool storehouse and scattered at once on a sail already heated to the required temperature, whereas in Prof. Dean's experiments the temperature was raised rather gradually. Had the seed been exposed in the early morning, higher temperatures and a longer exposure would probably have been necessary, and weevils would also have had time to escape. The immediate deposition of a cool weevil on a hot bucksail seems essential, therefore, if one is to avail oneself of the lowest lethal temperature.

3. A calm clear day should be selected, since the shadow of a cloud or a slight breeze will cause the sail temperature to drop rapidly. The altitude and windy position of the Experiment Station made it impossible to secure the required temperature for long periods during the winter; a difficulty, however, which should not occur in lower or more sheltered situations.

It should be borne in mind that the above experiments refer only to the rice weevil; that they are incomplete, and were only conducted on a small scale. It is not, of course, to be inferred that this method is applicable to large quantities of grain; the suggestion is only put forward in a tentative manner, in the hope that further experiments may prove it to be of value as a cheap way of freeing small quantities of perhaps specially selected seed from this pest in localities where it may be difficult to obtain carbon bisulphide. This suggestion is put forward at the present time, since weevils are liable to increase very rapidly during October and November, and during these months the soil frequently reaches the temperature required. Other modifications, such as the use of flat rocks, or sloping iron sheets over which grain could be slowly passed, will doubtless occur to the reader.

The last question is that of possible injury to the seed. No comparative tests have been made as to germinating power of sunned and untreated seed, but the probability of injury seems remote, if one considers that seed is often exposed to sun for long periods during the harvest. Dr. Bourcart, in his work on "Insecticides," gives the following figures for seed wheat heated one hour in a stove:—At 221 degs. F., 97 per cent. germinated; at 240.8 degs. F., 93 per cent., injury to the seed only shewing at 248 degs. F., when the germination dropped to 56 per cent.

Tobacco Industry.

The following circular has been issued by the Committee of the Rhodesia Tobacco Co-operative Society (Registered). It has already appeared in the *Rhodesia Herald*, and we understand is being distributed amongst actual and potential tobacco planters throughout the country. We have been asked by the Committee to reproduce it in this *Journal*, so that it may reach every farmer who may not be reached by the daily paper, or has not received one of the circulars.

While not holding ourselves responsible for the contents of the circular, we are glad to reprint it in the interests of the tobacco industry.

CIRCULAR.

The time for planting tobacco seed beds has again come round, and tobacco growers and farmers may probably be glad to have some indication as to whether or not they should grow tobacco for the coming season.

The present state of the tobacco industry, and the causes of the serious plight in which the growers find themselves to-day, are fairly well known and need not be gone into here. The question to decide is whether or not tobacco growing should be continued for the coming season and for the future.

The first point to be considered is the cost of growing. From careful enquiries made there seems to be no reason to doubt that, by working economically, the cost of production can be materially reduced, and it should be noted that it costs no more to grow good leaf than inferior.

The second point is the cost of grading, classifying and preparation for market. There is no question that hitherto the expenditure under this head has been more or less an unknown quantity and far too high, but the lesson has been learnt, and there is no doubt whatsoever that, provided a sufficient quantity of leaf is produced and the planters really co-operate and work together, the working charges can be brought down to a maximum of 1d. per lb. A new society has been formed, and is now at work grading and preparing for the market the 1915 crop.

SUCCESS OF THE SOCIETY.

All arrangements made by the Society are of a temporary nature, on very modest lines, and many difficulties have had to be overcome; but the business is being conducted on sound economic and business lines by the growers themselves, and even with a very small crop the working expenses will not be more than 1½d. per lb. The success or otherwise of this new Society is entirely dependent on an intelligent interest being taken in the venture, and a spirit of loyal support and co-operation being developed by the planters themselves.

We now come to the important point of markets and the price than can be realised for the leaf. Here again careful enquiries have been made, and as far as can be ascertained Rhodesia should be able to sell in South Africa at remunerative prices a quantity of not less than 1¼ million pounds per annum. There is never any difficulty in disposing of good tobacco at a profitable price; the trouble has been, and still is, to sell the rubbish which is mis-named tobacco.

GOOD HEAVY TOBACCO.

In addition to good bright leaf, which commands a ready and remunerative market, there is quite a fair demand for a good heavy tobacco with plenty of body, and it is as well to mention here that for this class of tobacco there is every possibility of a large and remunerative market open to Rhodesia in Australia. Enquiries are being prosecuted at the present time, and all possible information is being obtained. Any farmers having suitable heavy soil are recommended to grow a dark mahogany leaf and air cure this, as, from information gathered, a considerable quantity of this description of tobacco can be disposed of at good prices. There are left the inferior grades of tobacco. As to inferior leaf, it is fully realised that it is not possible to grow all good leaf; but every effort should be made in this direction, and with care and by only planting an acreage that can be economically and properly worked, the bulk of the crop should be a good-class, saleable tobacco. For the cheaper or inferior grade, whilst a considerable quantity can with some trouble be disposed of, the prices obtainable are not such as to tempt growers to grow this class of tobacco.

QUALITY V. QUANTITY.

It is apparent that in the past planters have not exercised sufficient care. In many cases quality has been sacrificed for quantity. Tobacco has been sent in to the warehouse badly cured and badly baled. Good bright leaf has been mixed up with green, dark, and all descriptions of rubbish. This leads to increased cost of working, and growers should use every endeavour to keep similar leaves as far as possible together; at any rate, bright leaf should be kept apart from inferior leaf. No mention has been made of tobacco of, say, a less value than 4d. per lb. This has been intentional, as, whilst it is practically impossible to eliminate this article entirely, it should not really enter into any calculation, as tobacco that will not realise more than 3d. per lb. is not worth the time and trouble of growing and the cost of working, to say nothing of expense of railage and transport to warehouse.

FUTURE PROSPECTS.

As to the prospects for the future, it has been pointed out that a certain quantity can annually be absorbed in South Africa, giving a satisfactory return. Then there is Australia waiting to be exploited, and, further, the quantity grown in the past season was far below the average; and whilst it is true there were large stocks of the previous year's on hand, the majority of this was of the inferior grades, and the great bulk has now been disposed of. This leaves the planters with a clean page, and every farmer who has suitable ground, and is in a position to do so, is recommended to grow good tobacco, and in every case aim for quality, not quantity.

It is true that the tobacco industry has received a severe set back, but this is equally true of other industries in the country, and there is every reason to hope that tobacco in Rhodesia has a future. The question as to whether Rhodesia can produce a high-class leaf of tobacco has been proved, and is no longer in dispute, and planters are urged not to throw up the sponge, but to continue growing; study economy in working; above all, pull loyally together. Keep a careful note of the costs, both in the growing and the working of the leaf, and advise the Society of the acres planted and the yield anticipated, in order that adequate arrangements may be made for dealing with and disposing of the tobacco when reaped. Do not waste time and money in curing tobacco that will be of more value if put back into the soil as a fertiliser.

The Company's Warehouse.

As you are well aware, there is in Salisbury a splendid tobacco warehouse thoroughly well-equipped and capable of dealing with a large quantity of leaf. Although, owing to regrettable circumstances, this warehouse is not now being made use of, there is every reason to be confident that, by unanimity and concerted action on the part of the growers, it will be possible in the future to obtain the use of these buildings and appliances on suitable terms.

It is as well to bring to the notice of growers that, whilst every effort is made to prepare the leaf with the least possible delay, it is not desirable to place the tobacco on the market in too much hurry, owing to the improvement in condition that undoubtedly occurs after baling. It is hoped that for future crops such financial arrangements can be made as will enable planters to receive advances to meet cost of labour, etc., on somewhat similar lines to those in operation with the maize Co-operative Society.

Co-operation in the Midlands.

We have received from Col. Leonard, of Gwelo, Chairman of the Provisional Co-operation Committee for the Midlands, the following notes on the development of the co-operative movement in that district. The steady expansion of this movement in Rhodesia is a hopeful sign, and full of promise for the increased stability of the farming industry :—

Some twelve months ago, as the outcome of a general meeting of delegates from all the farmers' associations of the Midlands, held to discuss the question of co-operation among farmers, a committee was appointed to consider the details of the matter, and prepare suggestions for presentation to a subsequent general meeting. That committee met with various difficulties, but is now able to present a report.

For the purpose of considering this report, each farmers' association has been asked to appoint delegates (any number) to attend a meeting to be held at the Royal Hotel, Gwelo, at 10 a.m. on Wednesday, the 27th October, 1915.

Since the first meeting on this subject, the position with regard to co-operation has undergone a considerable change. To-day the farming community is more alive to the acute need for co-operation, and the merchants realise the benefit that union among the farmers will bring to them.

A further important step that creates a vital need for action in the Midlands is the establishment of a large co-operative society in Bulawayo. The Midlands will, therefore, have powerful co-operative societies both to the north and south. Geographical reasons and the difference of local conditions are against a satisfactory fusion of the Midlands with either society, and our own progress and prosperity demand immediate action, if we are to preserve and consolidate the well-being of the farming community here.

A strong society in the Midlands would co-operate with the sister societies to their and our own mutual benefit, and we are assured that the establishment of such a society would be regarded favourably both in Salisbury and Bulawayo, and would receive assistance from these centres.

In discussing ways and means, the committee invited suggestions from the Chairman and Managing Director of the Central Co-operative Society, who attended our meeting. Should the farmers approve of steps being taken to inaugurate a society here, it would be well to consider the advisability of joining the existing Central Co-operative Society, which, at present, has its headquarters at Iron Mine Hill. That society, which was established under and is conducted according to the Rhodesian Co-operative Societies Ordinance, has supplied the committee with copies of its rules and regulations, which have been distributed to the associations. With very little alteration, these rules could be made applicable to a central society, and the title is *a propos*. By adopting this course, the trouble and delay of initiative would be avoided, and operations could be begun as soon as desired.

It is hoped that all the associations of the Midlands will discuss the matter thoroughly, and provide the delegates with any amendments to the suggested rules that may be deemed advisable. A central office could be placed in Gwelo, and directors appointed from each district, whilst local committees could be appointed to carry out egg circles, transport, etc. Debates on these and other points would fully prepare the delegates for the meeting, to which, if possible, they should bring lists of farmers willing to join the society.

The committee desires to emphasise the need for prompt and decisive action, if our markets are to be maintained and developed, and the farmers are to secure the greatest possible return for their work. We all hope for good crops in the coming season, and should the returns be only fairly good, the farmers, unless they are united, will be faced with falling prices and a capricious and uncertain market.

Correspondence.

COST OF DIPPING TANKS.

To the Editor,
Rhodesia Agricultural Journal.

Sir,

A few remarks on the subject of how to construct the much-needed dipping tank on an economical scale, so that those with limited capital can build their own tanks, may perhaps be of some use to those who care to avail themselves of my contribution. The Public Works Department frequently supply plans and specifications as a guide to those who contemplate building tanks. But the quantity of material specified and cost of building these are so much out of proportion to the requirements that they are actually the cause of the delay in building these tanks—in fact, the aim seems to be to increase cost rather than reduce it to a safety limit. This being the case, most would-be builders are so incapable of financing themselves that they look toward Government assistance.

I have been informed on good authority that the amount already granted by the Government towards the building of dipping tanks makes a total sum of £25,000. I wonder how many tanks were constructed with this sum on the £ for £ principle?

Here I will add that the cost of a tank depends on circumstances.

In towns, as well as on a small percentage of farms where rock is not obtainable, the cost of a tank will be greater, but I can safely say that for 90 per cent. of all the tanks required nature has provided rock in close proximity, and if this is used as a substitute for concrete the price of a tank may be reduced to one-tenth the cost of those suggested by the Public Works

Department, and be in every way as durable for what they are intended.

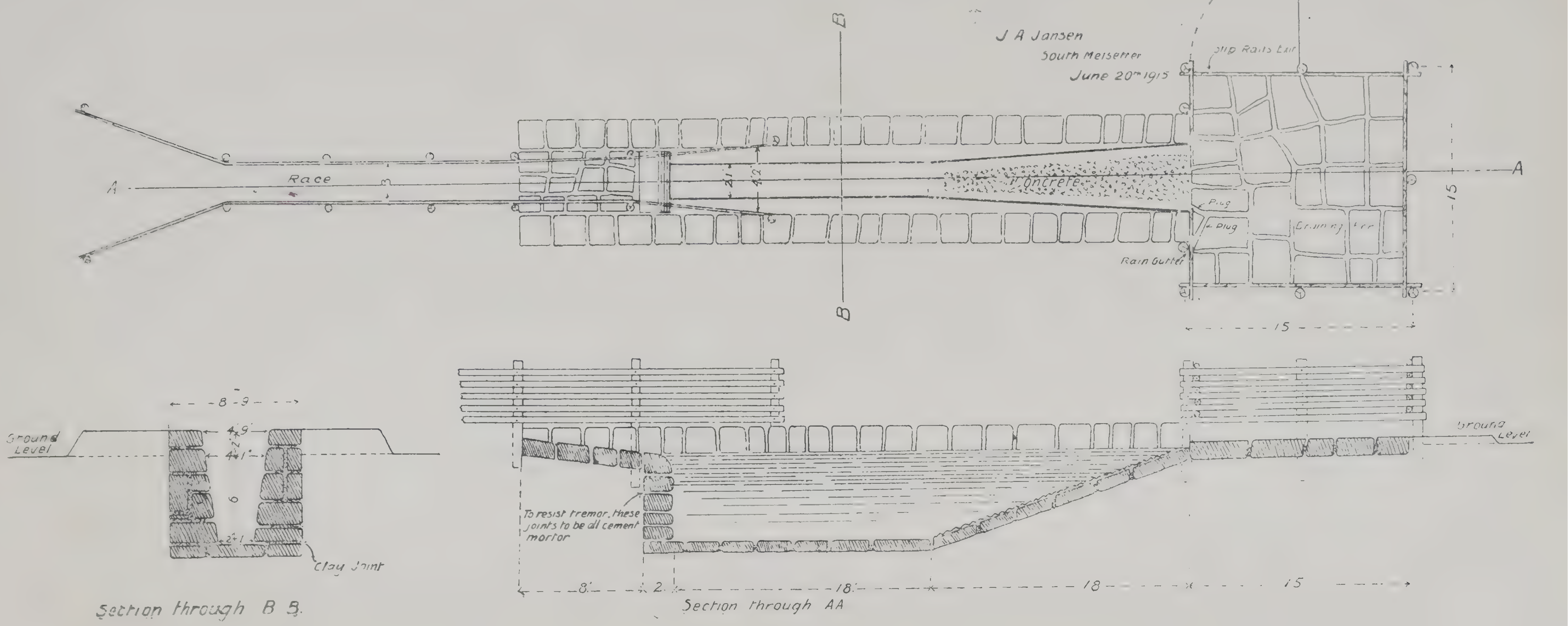
I append a sketch giving dimensions, mode of construction, cost, etc., of a tank built on my farm. Therefore, if economy is desired, and yet to obtain good results in building your dipping tank, adhere to the following explanation :—

Site of Tank.—In locating a site for a tank it is of course desirable to select a position where the tank can be filled direct from a running stream or well, but in both cases avoid swampy and wet ground, as settlement may occur.

Excavation of Tank Pit.—When you have designed the length, width and depth of your tank, excavate according to dimensions and always excavate the pit with a vertical earth face. Some argue that this design creates pressure against your tank, and they adopt a sloping face on which they build their tank. This is erroneous, and should be well understood. In the former case the earth is in such a consolidated condition that it exerts little or no lateral pressure. But in the latter case after long drought infiltration from adjacent ground during heavy rains may cause settlement and your tank will crack.

Rock Material.—The use of rock as a substitute for concrete is with the object of a saving in cement, which is the most expensive item in the building of a dipping tank, and especially to those who live at remote distances from the railway. In quarrying stones, select blocks of nearly the required shape, so as to reduce work of dressing; also reject decomposed material, to avoid fissures. If large slabs can be obtained, these serve well for the floor of your tank, draining pen, etc. When sufficient material is ready to start your tank, proceed with the floor. Large blocks serve well for the sides. It conduces to strength not to make each course of uniform height throughout the walls, but to have some of the stones sufficiently high to reach up through two or three courses. By this means the whole becomes more effectually interlocked or bonded together as one mass, thereby increasing stability, which should be your aim while this work is in hand. The whole of the stone material (except the end of the tank where the cattle enter) may be built in clay or earth-mortar, leaving the joints open facing the tank to a depth of 3 inches to receive the

PLAN OF ECONOMICAL DIPPING TANK



J A Jansen
South Melsetter
June 20th 1915

Section through B B.

Section through AA

cement pointing. Having now built your foundation for the tank, your next aim is to make it water-tight.

Pointing with Cement-Mortar.—Your work is now to inspect all joints. If they are too fine, they must be enlarged to about 2 inches in width by a stone hammer and scraped out to a depth of about 3 inches. They should be thoroughly cleaned to ensure adhesion of the cement-mortar.

Mixing of the Cement-Mortar.—Different proportions may be suggested, but the following is the proportion used in the tank on accompanying sketch :—One part of good Portland cement to three parts of clean sand, mixed in small quantities on the floor of the tank under shelter, using very little water, so that the mortar when ready for use appeared rather incoherent and quite deficient in plasticity. It was put in the joint by a trowel, a straight-edge being held just below the joints as an auxiliary. The mortar was then well calked into the joints by a calking iron. This was repeated until the joint was full. It was then rubbed and polished under as great a pressure as a native could exert. The joints were kept damp during the process of the work. The stones in the end wall of tank at the entrance were set in cement to resist vibration. When all pointing was completed, the walls of tank were found to be rough. They were then thoroughly scrubbed and received a coat of plaster $\frac{1}{4}$ inch thick, and were kept damp for seven days. On the eighth day the tank was filled with water to a depth of 6 feet. In 24 hours there was a fall of $\frac{3}{4}$ inch; on the ninth day a fall of $\frac{1}{2}$ inch; on the tenth day no fall was perceptible and no further infiltration has taken place.

The draining pen is 15 by 15 feet square, this being most suitable to the slope of the ground. The floor consists of large flat stones, with all joints pointed in cement-mortar precisely as the tank. The four sides of the pen slope towards the centre, which is 2 inches lower than the drain gutter near the tank. By this means all dung accumulated while cattle stand in the pen does not enter the tank, but settles on the floor and can be removed when necessary.

Cost of Building Tank.—In giving cost I will state that I am making no allowance for my own labour and supervision because I consider it part of ordinary farm work, and hope to be compensated by improving the condition of my cattle by regular dipping. Likewise do I omit charges for work done by my own team of oxen employed on the work. I also omit cost of timber for posts, fencing rails, etc., as it consists of native-grown timber. I merely give the actual outlay in cash, which is made up of the following items, viz. :—1st, cost of cement; 2nd, native labour; 3rd, spikes for fencing, etc.

4 barrels of cement	£6	13	0
Transport : 1,600 lbs. at 9s. per 100	7	4	0
Excavating tank pit : 2 boys, 4 days at 1s. per day	0	8	0
Quarrying rock : 3 boys, 5 days at 1s. per day	0	15	0
Hauling rock : 3 boys, 3 days at 1s. per day	0	9	0
Building tank : 3 boys, 9 days at 1s. per day	1	7	0
Cement pointing : 3 boys, 7 days at 1s. per day	1	1	0
Plastering tank : 2 boys, 2 days at 1s. per day	0	4	0
Dressing rock (if care is exercised in selecting rock, only the course facing the tank requires dressing) : 2 boys, 2 days at 1s. per day	0	4	0
Building draining pen : 2 boys, 2 days at 1s. per day	0	4	0
Cutting and hauling timber for posts, rails, etc. : 3 boys, 2 days at 1s. per day ...	0	6	0
Spikes for fencing rails : 20 lbs. 5-inch nails	0	6	8
	£19	1	8

Yours, etc.,

J. A. JANSEN.

Fortuna, South Melsetter,
20th June, 1915.

Departmental Correspondence.

Under this heading we publish correspondence between farmers and the technical officers attached to the Department of Agriculture, containing information which may be of interest and assistance to our readers.

SEED MAIZE.

The Assistant Agriculturist : In reply to letter with reference to seed maize. The two principal varieties grown in Rhodesia, namely Hickory King and Salisbury White, are among the varieties that fetch the highest price on the European market, being particularly useful for various commercial purposes other than feed. The yellow varieties of maize are used almost exclusively for feeding. Yellow varieties are also, as a rule, poorer yielders under favourable conditions such as obtain generally in Rhodesia.

Hickory King may have 8, 10 or 12 rows; Salisbury White has 12 or 14 rows. For show purposes, however, the classes are confined to 8 and 10 row varieties of the former and 12 row of the latter. It is true, however, that no one variety will throw entirely true for the number of rows. Eight row seed will always throw a certain percentage of 6, 10 and 12 row cobs. No fixity in number of rows is possible. It is also true that very frequently 12 row Hickory King may be taken for Salisbury White. Salisbury White is a comparatively new variety which was produced by crossing Hickory King with Natal White Horse Tooth or Boone County, the idea being to make the Hickory King a heavier yielder by this means. As a rule, Hickory King has proved the best mealie for the lighter soils prevalent in Matabeleland, while Salisbury White has given the best returns on the richer soils in parts of Mashonaland.

POULTRY.

In reply to enquiry regarding feather-eating, our Poultry Expert advises as follows :—

Chief Causes.—Over-heating food, lack of green and animal food, too strict confinement, no scratching material to scratch in to occupy their time.

Treatment.—Keep off mealies for a time. For a hard food, give a small grain as munga (wheat or oats if possible), scattered in litter in the run; a few bundles of grass will make suitable scratching material. Feed half ration of hard food early morning and half mid-day. Soft food at night. Into the soft food put about four teaspoonfuls of flowers of sulphur. Give plenty of *fresh green food* and *meat* in some form. *Not* meat meal—fresh animal food. Keep the birds scratching for their hard food all day; it will give them something to think about other than feather-eating. Do not give the full quantity of flowers of sulphur if the birds have not proper sleeping quarters, as it opens the pores of the skin; they will catch cold if not protected at night. If the sleeping quarters are cold or draughty, give two teaspoonfuls each night in the soft food.

Any bare places on the birds' bodies should be bathed daily with Condy's fluid. Do not give mealie meal until the birds are cured. *Keep them scratching as much as possible.*

Oranges for the Troops.

We are informed by the hon. secretary of the committee appointed to deal with the gift of oranges from Rhodesia to the troops at the front that the despatch of the fruit to France is now completed. Seventy-six cases, weighing five tons, were forwarded in three consignments from Capetown by the Union-Castle Line, who generously made no charge for freight, and it is hoped that the fruit will arrive in good condition for distribution to our troops in France. These consignments were reported by the Government Inspector of Fruit in Capetown as being in excellent condition.

A further 69 cases, in two consignments, were sent off from Rhodesia, but on examination of one consignment of 26 cases at Capetown, it was found that the fruit was not in a fit condition to go forward. It was unfortunate that, owing to the late arrival of one of the grading and sizing machines, the fruit in this consignment was packed in too ripe a condition, which accounted for its rejection by the Inspector.

Owing to freight not being available, on account of the refrigerating chambers being required for the conveyance of meat to Europe from the Union, the second consignment of 43 cases could not be given freight room, and it was decided to distribute the oranges to the troops leaving Capetown for Europe at that time.

The Agricultural Outlook.

The winter veld has been exceptionally good this year, owing to the abundant rains of last summer. The consequence is that stock throughout the country generally are in unusually fine condition for the time of year, but we hear of cases where they are not quite up to the standard of previous years, and it is suggested that the grass, though plentiful, has less nourishment in it than in ordinary seasons with a lower rainfall. In some districts the calves have not fared well, and seem to have suffered from the excess of rain and over abundance of rank grass. There have been losses among sheep from heavy rains, but the flocks are now doing well. On the whole, stock has wintered well, and the surplus of moisture in the soil, helped by the September rain, practically ensures an early growth of new grass, so that there is good ground to believe that most stock owners will succeed in carrying their herds well into the summer with less than the average loss and deterioration from the hardships of the winter. The number of deaths from poverty up to the present has been below average, and in some districts there have been practically none at all.

The law to prohibit the burning of the veld is having an effect contrary to what was intended, at least in one direction. It has always been known that grass which has escaped fire for one dry season or more becomes increasingly thick and matted each year, unless it is properly fed down by stock. The result is that, if a fire does get into it, it burns with a fierceness that easily becomes uncontrollable. This has happened in more than one district, the fires jumping roads and firebreaks and destroying miles of pasturage. This has placed the unfortunate stock owners that have been burned out in a precarious position for the time being, and unless they have provided ample store of winter feed, they must face the coming weeks with much anxiety, and hope for early rains and young grass. In some districts on the granite the new grass is already six inches high, but in other places it was cut back by August frosts, though even there it is beginning to feel the benefit of the September rain.

The harvest of summer crops is now practically complete. In most parts of Mashonaland the crop of maize has been very heavy, and in some districts of Matabeleland also the farmers have grain to sell for the first time in recent years. In many parts again, only enough maize has been produced for local consumption. Wherever winter crops have been planted, they are looking well, with the exception of certain parts where the frosts came at an unfortunate stage of growth and completely destroyed the standing crops. As a compensation for damage to summer crops from rain, it has been possible to plant a larger area than usual under winter crops without irrigation, and a fair acreage of early maize is already up and looking well. Tobacco planters have been active getting in their seed beds, though generally on a more modest scale than of old. The supply of seed potatoes is short, but those who have it, have mostly planted already under irrigation.

The absence of so large a proportion of our farmers on active service may possibly have some effect on agricultural operations in the coming season, but this should be minimised by the readiness of those left behind to do their best to help their neighbours, and their efforts to increase the acreage under cultivation on their own farms. Perhaps no question is giving farmers greater anxiety than the uncertainty of the maize market, but this is a point on which it is safest to offer no opinion.

The low price of slaughter cattle, as well as that of maize, is distinctly discouraging, especially in face of the very strong demand for both grain and beef overseas. Economists teach us that a short supply spells a long price, but the latter seems slow in coming. Doubtless the usual equilibrium will be restored after a time by the operation of the ordinary law of supply and demand, but the farming community is not prepared to wait, and naturally feels that " something must be done." " How oft our remedies in ourselves do lie, etc."

Veterinary Report.

July, 1915.

AFRICAN COAST FEVER.

SALISBURY DISTRICT.—A fresh outbreak occurred on the farm Luna adjoining Borrowdale. Four animals died or were destroyed. Four cases occurred at Borrowdale. No cases at any of the other infected centres.

MAZOE DISTRICT.—No fresh cases amongst the infected herd on the Belford Estate.

MELSETTER DISTRICT.—Three fresh outbreaks occurred, viz., on the farms Roslyn and Rookwood; in the latter case two herds belonging to separate owners were involved.

On the farm Joppa a re-infection occurred, through the herd which had been successfully removed to clean veld without loss in May being allowed back to the infected veld.

The erection of dipping tanks in the district is proceeding satisfactorily, and it is hoped that it will not be long before all cattle in the quarantine area can be regularly dipped.

During the month the following mortality occurred :—Farm Landsdown, 10 head; farm Landsdown, native cattle, 6 head; farm Randfontein, native cattle, 2 head; farm Wolvedraai, 2 head; farm Heilrand, 3 head; farm Highlands, 2 head; farm Ravenswood, 7 head; farm Roslyn, 7 head; farm Roslyn, native cattle, 4 head; farm Rookwood (a), 7 head; farm Rookwood (b), 4 head.

UMTALI DISTRICT.—Three head of cattle died in Penhalonga Valley. *Post-mortem* appearances were somewhat suspicious of Coast Fever, but microscopic examination proved negative. The herd is being kept under close observation.

TRYPANOSOMIASIS.

A slight mortality in cattle is reported from the Hartley district and one case from Melsetter district.

HORSE-SICKNESS.

Two horses died from this disease in the Charter district.

CONTAGIOUS ABORTION.

Three fresh centres were reported—two in Marandellas district and one in Mazoe district. The infection seems to be of a very mild nature, only a small percentage of the herds being infected.

GLANDERS.

The following animals were tested with mallein on importation and found healthy :—Bulawayo : Horses, 111 ; mules, 47 ; donkeys, 83. Umtali : Horse, 1 ; donkeys, 12. Melsetter : Horse, 1 ; donkeys, 20.

IMPORTATIONS.

In addition to the above, the following animals were imported :—Heifers, 264 ; bulls, 28 ; sheep and goats, 2,654 ; pigs, 3.

August, 1915.

AFRICAN COAST FEVER.

SALISBURY DISTRICT.—No fresh outbreaks. The following cases occurred during the month at previously infected centres, viz. :—Borrowdale, 2 head; Luna, 5 head; Sternblick, 1 head.

MAZOE DISTRICT.—A fresh outbreak occurred in a small herd at the Mazoe dipping tank. One animal affected and destroyed. The source of infection was the Belford Estate infected herd, which had been sent to the dipping tank about a week before the existence of Coast Fever was discovered in it.

One case occurred in the remainder of the infected herd on the Belford Estate. Only 13 head now remain of this herd; these will shortly be slaughtered.

UMTALI DISTRICT.—A fresh outbreak occurred in the Penhalonga Valley. Three animals died, one of which shewed lesions characteristic of Coast Fever on *post-mortem* examination. Microscopic examination proved negative. It is to be noted, however, that the preparations forwarded for examination were not satisfactory, being too decomposed for definite diagnosis.

MELSETTER DISTRICT.—Two fresh outbreaks occurred, viz., at the farms Rumble Hills and Quagga's Hoek. The former is adjacent to the previously infected farm Springfield. Six cases occurred in a herd of 216 head. The herd has been moved to clean veld, and is dipped every third day. The conditions are so favourable in this case that further loss, if any, will, it is anticipated, be very slight.

At Quagga's Hoek a gross infection, which must have been accumulating for several months, was discovered. Three small herds, aggregating 60 head, were involved, of which 43 died. This farm is about 30 miles from the nearest centre of infection in the district, and it is impossible to say how and when the disease was carried there. Fortunately none of the cattle on the adjoining farms have so far shewn symptoms of the disease.

At previously infected centres the following mortality occurred :—Landsdown, 1 head; Landsdown, native cattle, 25 head; Randfontein, native cattle, 3 head; Wolvedraai, 8 head; Joppa, 8 head; Highlands, 9 head; Rookwood (a), 21 head.

CONTAGIOUS ABORTION.

Four cases in a large herd in Mazoe district were diagnosed by the agglutination test.

GLANDERS.

The following animals were tested with mallein on importation and found healthy :—Bulawayo : Horses, 79 ; mules, 19 ; donkeys, 18. Plumtree : Donkeys, 14. Gwanda : Horses, 4 ; donkeys, 4.

IMPORTATIONS.

In addition to the above, the following animals were imported :—Heifers, 286 ; bulls, 41 ; sheep and goats, 3,063.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Applications for Use of Water

in terms of Chapter I. of the "Water Ordinance, 1913."

SUMMARY.

IT is hereby notified that the following applications have been made, in terms of the "Water Ordinance, 1913," for authority to use water :—

Government Notice No.	Name of applicant.	From what river.	Native district of	For the purpose of irrigating a certain portion or portions of the
262	Hallam & Beattie...	Zidza	Chilimanzi	Farms Lovedale and Wylde
263	British South Africa Co.	Pongo	Bubi	M'bati Tiabets Block and Shangani Reserve
272	British South Africa Co.	Odzani	Umtali	Farms Umtasa's Reserve, Wye, and B.S.A.Co. Reserve on the left bank of the Odzi River
295	James Ross ...	Umtenje	Salisbury	Farm Cromlet
296	G. A. Peacocke ...	Umtenje	Salisbury	Farm Learig
297	H. H. D. Christian	Mabfen and Umtenje	Salisbury	Farm The Meadows
298	Watson & Ross ...	Umwindsi	Salisbury	Farm Umritsur
299	James Watson ...	Umwindsi	Salisbury	Farm Kilmuir
300	H. D. Rawson ...	Mabfen	Salisbury	Farm Alderley
305	R. S. Fairbridge ...	Odzani	Umtali	Farm Kingsley
306	A. R. Morkel ...	Umwindsi	Mazoe	Farm Ceres
307	M. Singer ...	Tatagura	Mazoe	Plots Poorte View, Tatagura and Tatagura Extension
308	W. E. Thurlow ...	Poti	Mazoe	Farm Atherstone
331	J. L. Stokes ...	Odzani	Umtali	Farm Kelly's Park
331	H. H. O. Bridgeman	Odzani	Umtali	Farm Alderberry
331	Col. O. Baker ...	Odzani	Umtali	Farm Chikonga
331	Austen Jackson ...	Le Rhone	Victoria	Farm Le Rhone
335	A. C. Henderson ...	Dassura	Mazoe	Farm Great B
335	E. R. Plant ...	Ingurui	Mrewa	Farm Mignon
335	E. E. Homan ...	Manica and Umwindsi	Salisbury	Farm Craig
335	F. Eyles ...	Tatagura	Mazoe	Farm Umsasa
335	C. C. Townsend ...	Mazoe	Mazoe	Farm Lowdale
335	G. W. Bredenkamp	Umzingwane	Filabusi	Farm Pioneer Rest

Any person or persons whose rights may be affected thereby are hereby called upon, in terms of the regulations published under Government Notice No. 331 of 1914, to lodge, within three months from the date of Government Notice, at the office of the Water Registrar, Salisbury, from whom further particulars are obtainable, their objections (if any) to the granting of these applications, together with a full statement of the grounds for such objections.

Farming Calendar.

October.

BEE-KEEPING.

During this warm month give plenty of ventilation by raising the front of the hive from the floor board, and then insert two pieces of wood about one inch in thickness at the corners of the entrance. In good districts it may be necessary to remove a crate or two of honey; in doing this, the carbolic cloth is preferable to the bee-escape, and replace these with properly-fitted crates, for the honey flow is by no means finished. Be sure that the hives are well shaded, and keep the apiary free from weeds.

CITRUS FRUITS.

Irrigation should be continued, followed by thorough cultivation, if no good soaking rains occur. From about the middle of this month to middle of next is the best time to plant orange trees, as they have hardened up their first growth, and if properly attended to will commence to grow right away, so that by the end of the growing season they will have put on considerable growth and established themselves well in the ground.

ENTOMOLOGICAL.

Maize.—Where circumstances permit the early planting of maize, cutworms and stalk borer are apt to inflict severe damage. See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912.

Tobacco.—Cutworms, stem borer and leaf miner are liable to be troublesome in the seed beds. See "Handbook of Tobacco Culture," published by the Agricultural Department, pp. 71-90.

Potato.—Defoliation by caterpillars is mainly to be feared. Use an arsenical wash.

Cabbage, Turnip, etc., sometimes suffer severely from diamond back moth and webworm. Spray or dust with an arsenical compound. See "Cabbage Webworm," *Agricultural Journal*, February, 1914.

Bean.—A few traces of stem maggot may be seen, but severe injury has not been noticed as early as October. See "Bean Stem Maggot," *Agricultural Journal*, April, 1913.

Citrus Trees may be sprayed for scale after the fruit has set. Resin wash should be used for this purpose. Fumigation is still more effective.

Deciduous Fruit Trees, including grape vines, are liable to attack from chafer beetles. See "Chafer Beetles," *Agricultural Journal*, December, 1914. Early peaches are frequently attacked by fruit moths, and choice varieties should be netted to keep these away.

Fig.—Fruit infested by fig weevil should be collected and destroyed.

FLOWER GARDEN.

All flower seeds, annual and perennial, may be sown as in September. A word or two on open seed beds may not be out of place here. These beds should be prepared in a sheltered position, and the soil should be well and deeply dug. This is more essential than at first thought, as in this state the soil when once watered is more easily kept moist, and is not so liable to cake. The top dressing should be free from all undecayed vegetable matter, and, when sown, the seeds should be covered with a thin dressing of fine light soil, over which a thin covering of grass may be placed to check evaporation.

Transplanting from boxes or beds should be done on a dull day or towards evening; the plants should be well watered before being removed, and the roots disturbed as little as possible, care being taken that the latter have their full depth and spread when planting.

FORESTRY.

Prick out into tins any trees that are ready. If the ground is soft enough, harrow and cross-plough the land broken up in the early autumn. This is a good month for stripping wattle bark.

POULTRY.

Do not work the breeding stock too long. Early mated pens should now be broken up. Early hatched cockerels, which should have already been separated from the pullets, should be carefully watched, with a view to selecting next year's stock birds and those for market. All houses, specially those of the young stock, should be attended to at once, if they are not weather proof. Do not attempt to rear backward and weakly chicks through the wet season; they should be killed at once.

STOCK.

Cattle.—Ranching cattle on granite veld will normally be in good condition now. On diorite soils the veld will not be so mature. In either case it will be well to keep back a supply of hay or ensilage for any weaker animals, especially down calving cows, in the event of late rains. Dipping should be regularly attended to. Calves should be weaned and branded, if this has not already been done. If calves are not wanted in mid-winter, the bulls should be taken out of the herd now until December. Dairymen will need to feed fairly well in so far as concentrated foods are concerned, but will use their discretion as regards ensilage and other succulent foods in accordance with the condition of their veld. In all cases care should be taken that drinking places are clean, and the water sufficient for the needs of the stock.

Sheep.—If spring lambs are expected, see that the sheep shed is in order, and keep back a little hay, ensilage or mealies for the poorer ewes in case of late rains. Be careful that all drinking places are clean, and that the water supply is sufficient.

VEGETABLE GARDEN.

As in September, nearly all vegetable seeds may be sown. Early potatoes should be earthed up when reaching the height of about eight inches. In planting a small amount of marrow, melon, cucumber, and pumpkin, the writer has found it economical to sow the seed one in a tin and transplant when about four inches high in hills. A few cucumbers planted in this manner yielded nearly 400 a week for about two months. Sweet corn and mealies may also be sown this month.

VETERINARY.

White scour is prevalent in spring—November and December—but dipping is eradicating this disease. There is still danger from vegetable poisoning, and it will only disappear when there is plenty of good grass on the veld.

WEATHER.

This is apt to be a hot dry month, and rather trying, therefore, to man and beast, and the strong winds which blow at this season add to the general discomfort. Evaporation is, as a consequence, at its greatest at this time of year, and dams and pools lose most from this cause. The prevalence of veld fires and the extent of burnt veld frequently found at this time of year add to the anxiety of the stock owner. The average rainfall in Mashonaland is from one to one-and-three-quarters of an inch; in Matabeleland one inch or so, and rather less in the Zambesi Valley. Generally speaking, the rain is more plentiful and earlier in the eastern districts, and takes the form of thunder showers at this time of year.

The rainy season has occasionally started early in October, but for practical purposes it need not be expected before the end of this month. The days are becoming warmer, and often even hot and oppressive. Clouds gradually collect, at first disappearing at sunset, but later becoming more persistent. Sheet lightning is usually frequent, and showers of gradually-increasing severity mark that the rainy season has set in. Steps should be taken in advance to provide for the run-off after such torrential rains, otherwise serious loss may result.

November.

BEE KEEPING.

Provided the bee keeper has the opportunity, he should study and make notes for future reference of the flowers which are visited by bees in his district. It is important, now the honey flow is on, to see that the hives stand perfectly level, otherwise crooked sections and shallow frames of honey will be built, thereby causing trouble when preparing these for market. If bees resent the removal of honey, it is better to stop and cover them down at once; try again another day. Artificial swarms can now be made. Where it is decided to hold back any honey for future requirements, store it in a bee-and-ant-proof box. All honey should be carefully graded.

CITRUS FRUITS.

If no appreciable rain has fallen, irrigation must still be resorted to, in order to keep the trees in good growth and not allow any check to the fruit. This is the best month to sow beans or other seeds for ploughing in later as green manure. Sow about 75 lbs. of kafir beans per acre, so as to cover the whole area with a green covering.

ENTOMOLOGICAL.

Maize.—The chief enemies during November are cutworms, stalk borer and surface beetles. See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912. The black chafer is sometimes very injurious on damp soils, but the insect has been imperfectly studied as yet.

Tobacco.—Practically all the enemies of this crop are injurious when it is newly planted out. See "Handbook of Tobacco Culture," published by the Agricultural Department, pp. 71-90.

Potato.—The first brood of the leaf-eating ladybirds commences in November. See "Two Ladybirds injurious to Potato," *Agricultural Journal*, October, 1913. Blue blister beetles are frequently a nuisance on sandy soils, and caterpillars may be troublesome. An arsenical spray will check these pests.

Cabbage, Turnip, etc., suffer chiefly from diamond back moth and webworm, either of which may be injurious. See "Cabbage Webworm," *Agricultural Journal*, February, 1914. Dusting with paris green and lime will check the diamond back moth.

Bean may suffer from aphis, if the weather is dry. Soap wash or tobacco wash will give relief. Stem maggot is rarely serious as early as November.

Citrus Trees may be sprayed with resin wash for scale.

Deciduous Fruits.—Chafer beetles and fruit moths are the chief troubles. See "Chafer Beetles," *Agricultural Journal*, December, 1914. Netting the trees is the only known remedy for the latter.

Fig.—Fig weevil is apt to be troublesome. The infested fruit should be collected and destroyed.

FLOWER GARDEN.

All seeds may now be planted. Annuals for January flowering should be sown, amongst which the following will be found to do excellently in this country :—Balsam, Calliopsis, Centurias, Chrysanthemum, Dianthus, Eschscholtzia, Marigold, Mignonette, Gallardia, Phlox, Poppy, Nasturtium, Nigella, Verbena, and Zinnia. These are all hardy, and may be sown in the open either in beds or in the position desired for flowering. Advantage should be taken of each shower of rain during this month to keep the soil well worked and loose.

FORESTRY.

Any young plants that are still in the beds should be pricked out into tins in the early part of this month. It is really rather late for this work. If the cross-ploughing and harrowing was not tackled last month, it should be done now.

POULTRY.

Do not allow young stock which has not reached the perching stage to sleep on damp litter. If there is any chance of rain driving into the house at night, some protection must be fixed up. Do not rely upon the rain to fill the water troughs. These should receive the same attention as during the dry season. Care must be taken that there is no waste of food, as, with the advent of the rains, all the stock will pick up an abundance of natural food. A smaller quantity of green food may now be given, but it should not be omitted altogether.

STOCK.

Cattle.—Normally rains will have fallen and the veld will be plentiful now. Beyond careful dipping, ranchers should not have much worry. If the season is bad, the poorer cattle should be drafted out and given a little hay, ensilage or mealies daily. Dairymen will not require to feed much succulent food, and usually the more expensive protein foods may be considerably curtailed at this time, but good sweet hay and mealies will be found to be very beneficial to milch cows, even if the veld is very plentiful.

Clean dry sleeping places for both cows and calves will pay handsomely for any extra trouble involved. Young calves do not need to walk far, and in wet weather are much best in a clean dry pen. Watch for ticks.

Sheep.—Keep the sheep on high dry land. Be careful to keep the ticks down. Be sure the kraal or sheep shed is dry and clean, and that there is shelter from the rain for young lambs.

TOBACCO.

Continue to sow seed beds, watering, etc. When early beds become overgrown and hard, pull out, dig up and re-sow. Begin transplanting with the first good rains, and continue as fast as the rains and planters will allow, until the crop is set out.

Be careful to fill in the misses from previous transplanting before starting on new fields; use the stoutest and best plants for filling in, and try to get the tobacco from any one field to grow and come to maturity as near at the same time as possible. Discontinue filling in when the field has been planted for several weeks, and has made a good start to grow, as the later filled in plants will be choked out by the earlier ones, and will not come to maturity.

VEGETABLE GARDEN.

All vegetable seeds may be sown during this month. Tomatoes and early peas and beans should be staked. The soil should be kept loose and free from weeds, which now get troublesome. Sow pumpkin, mealies, peas, and potatoes.

VETERINARY.

Early heavy rains might bring on horse-sickness before its usual time, but as a rule it need not be feared till the first rains are over in December.

WEATHER.

The rains should be commencing, if not already begun; occasionally they have delayed until December, and even later, before setting in properly. Between spells of wet weather lasting several days, fine dry periods occur, at first clear, but later cloudy and thundery, gradually gathering to burst in thunder storms. The mornings are generally fine, and rain falls chiefly in the afternoon or evening. Heavy downpours are to be expected, and should be provided against beforehand by means of ditches and embankments, and by clearing water ways and furrows.

In an ordinary season the rainfall is from four to five inches, more in the east and less in the west and in our two great river valleys of the Zambesi and Limpopo. Before the rains commence, severe heat, trying on account of the strong winds and the dryness of the air, is likely to be experienced.

Market Reports.

The number of live stock of all kinds offered on the Salisbury market has been comparatively small. Very few of the slaughter cattle on the market have been prime or even reasonably fat. In the produce line, onions and potatoes have been scarce, and beans continue to bring good prices.

On 20th August Messrs. Jennings & Logan held a cattle sale at Makwiro, when 120 head of cattle and 140 sheep and goats were put up to auction. The attendance of buyers was small, and a number of lots were withdrawn, as the bids were not satisfactory, but we are informed that all the stock not sold by auction subsequently changed hands privately. Among the prices realised by public sale were the following:—Slaughter oxen, weighing about 550 lbs., £10 10s. each; a mixed lot of half-bred Fries-native cattle, including heifers, £7 5s. each; Angoni cows, £5 each; half-bred Fries-Jersey cows, from £9 12s. 6d. to £11 per head; Fries-Mashona cows, with calves at foot, £8 5s. The restrictions on cattle movement, due to Coast Fever, tend to keep the price of stock low and deter possible buyers from attending.

Messrs. Boggie & Co. held their regular quarterly cattle sale at Gwelo on 8th September. As usual there were a large number of entries—in all, not including small stock, about 700 head. The number of buyers was not as numerous as usual, this doubtless being owing to the inclemency of the weather, the day being bitterly cold and drizzling, and the fact of the Jewish holiday being held on the succeeding day may have also prevented some of the usual Salisbury buyers from attending. There were, however, several new buyers from the Umvuma district, who shewed a keen demand for trek and breeding stock. Trek oxen were in better demand than usual, the average price being about £8 per head. There were several buyers on the lookout for both Mashona and colonial heifers. All Mashona heifers were sold, the price being £4 to £5 per head. As was to be expected, prime slaughter stock were not in evidence, but anything shewing good weight averaged about 35s. per 100 lbs. Tollies realised about 40s. to 50s. per head; heifer calves, 37s. 6d. to 40s. There was no demand for horses, mules or donkeys, and a number of sheep were withdrawn, as there were no buyers. There was no sale for carts, but enquiries were made for buck wagons, but there were none on the market. There were a number of fowls, which were sold for 4s. per head.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs.	9/0 11/0	—	—	25/0
Beans, 203 lbs.	16/0 36/0	—	—	25/0 30/0
Boer Meal, unsifted, 200 lbs.	—	—	—	50/0
Bran, wheaten, 100 lbs.	6/9 7/0	—	—	15/0
Flour, 100 lbs.	—	—	—	26/0 27/0
,, Colonial, 100 lbs.	—	—	—	27/6 30/0
Forage, 100 lbs.	3/6 6/0	—	—	8/0
,, Colonial Oat	—	—	—	—
Hay	Bale. 3d.	—	—	35/0 40/0
Kaffir Corn, 200 lbs.	6/6 7/0	6/6 7/9	—	9/0 10/0
Manna, 100 lbs.	2/6 3/9	—	—	—
Mealies, S.A. White, 203 lbs.	7/0 7/4	7/6 8/6	—	7/0 7/6
Mealies, Yellow, 203 lbs.	7/6 8/0	8/0 9/0	—	—
Mealie Meal, White, 183 lbs.	—	—	—	8/0 9/0
Munga, 200 lbs.	—	—	—	11/0 12/0
Monkey Nuts, bag, 83 lbs.	—	—	—	7/0 8/0
Oats, 150 lbs.	7/6 8/0	—	—	25/0 27/6
Onions, 120 lbs.	39/0 41/0	—	—	35/0
Peas, 200 lbs.	22/0 23/0	—	—	—
Potatoes, new, 150 lbs.	12/0 14/0	5/0 18/0	—	18/6 22/6
,, old, 150 lbs.	7/0 10/6	—	—	—
Rapoko	—	—	—	7/6
Rye, 200 lbs.	15/0	—	—	—
Salt, 200 lbs.	4/6 5/0	—	—	11/6 12/0
Wheat, 203 lbs.	29/0 30/0	—	—	30/0
Butter, local, per lb.	1/6 1/7	1/4 1/11	—	2/0
Eggs, local, per dozen	11d.	7d. 10d.	—	2/0 3/0
Ducks, each	3/0 4/0	3/0 3/6	—	3/6 5/0
Fowls, each	1/9 4/0	1/9 2/8	—	2/6 4/6
Geese, each	4/6 4/9	—	—	—
Turkeys, cocks, each	6/0 17/6	4/6 8/6	—	12/6 17/6

LIVE STOCK.

Slaughter Cattle, 100 lbs.	36/0 40/0	—	—	30/0 35/0
Trek Oxen, trained	£6 £7	—	—	£7 £10
Local Cows, milk	—	—	—	—
Dairy Cows	—	—	—	£20 £25
Native Cows	£3/5 £9	—	—	£5 £7
Heifers, Colonial	—	—	—	£7 £8
,, Native	—	—	—	£4 £6/10
Pigs, live weight	3d. 5½d.	—	—	4d. 4¼d.
Horses, riding, salted	—	—	—	—
,, ,, unsalted	£5 £16	—	—	£25 £30
Mules, inoculated	£12 £20	—	—	—
Donkeys, geldings	£3/10 £4	—	—	£4
,, mares	—	—	—	£5 £7
Goats	10/6 28/0	—	—	12/6 15/0
Persian Ewes	—	—	—	20/0 22/6
Cross-bred Ewes	—	—	—	17/6 20/0
Sheep, slaughter	10/6 27/6	—	—	22/6 25/0

Weather Bureau.

TEMPERATURES.

Station	July		August	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MASHONALAND—				
Hartley—				
Franceys Farm	77·98	41·96	79·7	43·13
Gatooma	81·5	—	82·3	—
Giant Mine	—	—	—	—
Hallingbury Farm	74·1	41·9	77·3	43·5
Lomagundi—				
Clydesdale	—	—	—	—
Eldorado Mine	77·37	43·83	79·26	44·87
Kanyemba	87·7	53·2	88·6	53·6
Sinoia	84·3	41·2	86·7	42·7
Sipolilo	76·4	49·0	79·6	50·1
Makoni—				
River Junction Farm	—	—	—	—
Rupurara	68·5	43·3	66·4	45·12
Mazoe—				
Melfort Farm Estate	—	—	—	—
Shamva Mine	76·19	46·18	77·96	47·86
Melsetter—				
Melsetter	67·6	—	69·4	—
Mount Selinda	—	—	—	—
Vermont	67·5	50·7	—	—
Salisbury—				
Chishawasha	73·14	43·25	76·23	43·52
Glenara	—	—	—	—
Salisbury (Gaol)	74·1	45·4	77·0	45·7
,, (Agric. Dept. Offices)	71·5	45·5	—	—
Umtali—				
Chiconga's Location	74·6	47·1	74·3	47·0
Summerfield	63·6	52·6	—	—
Umtali High School	75·9	51·8	74·9	49·4
Victoria—				
Eythorne	—	—	—	—
Victoria	73·4	43·27	73·91	41·28
MATABELELAND—				
Bulawayo—				
Essexvale	75·9	41·6	78·1	42·2
Hope Fountain	—	—	—	—
Leighton	—	—	—	—
Observatory	72·9	45·4	—	—
Rhodes Matopo Park	74·3	43·2	77·1	46·6
Bulalima—				
Plumtree	—	—	—	—
Tegwani	74·3	47·5	77·7	49·2
Gwanda—				
Antelope Mine	71·97	48·99	—	—
Gwelo—				
Hagley (Iron Mine Hill)	74·9	43·7	—	—
Gwelo (Gaol)	75·2	—	75·6	—

TEMPERATURES—*(Continued).*

Station	July		August	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—(Continued)				
Mangwe—				
Empandeni	75·5	—	—	—
Tuli—				
Mazunga	76·8	47·0	82·2	46·7
Tuli	75·3	48·3	81·8	50·7
Wankie—				
Guyo	—	—	—	—
The Hospital	84·03	53·51	—	—
Victoria Falls	81·2	39·0	82·6	38·2

RAINFALL.

Station	July	August
MASHONALAND :		
Charter—		
Buhera	Nil	—
Driefontein	,,	Nil
Enkeldoorn	0·02	0·14
Grootfontein	—	—
Induna Farm	—	—
Marshbrook	Nil	Nil
Riversdale	,,	,,
Spitzkop	0·07	—
The Range	—	0·13
Umvuma (Railway)	Nil	—
Hartley—		
Ardgowan	Nil	Nil
Auchter Leny	—	—
Battlefields (Railway)	Nil	—
Beatrice Mine	—	—
Carnock Farm	Nil	Nil
Clifton Farm	—	
Elephant Hill, Battlefields	Nil	0·02
Elvington	,,	0·03
Franceys	,,	Nil
Gadzema	,,	—
Gatooma (Railway)	,,	Nil
Gatooma	,,	,,
Giant Mine	—	—
Gowerlands	Nil	0·03
Hallingbury	,,	Nil
Hartley (Railway)	,,	
Hartley (Gaol)	—	
"Jenkinstown"	Nil	
Makwiro	,,	—
M'pofha Farm	—	—

RAINFALL—*(Continued).*

STATION	July	August
MASHONALAND—(Continued)		
Hartley—continued		
Shagari	Nil	Nil
"Stoneygate"	,,	,,
Lomagundi—		
Banket Junction (Railway)	Nil	—
Clydesdale	—	—
Darwendale	Nil	Nil
Duxbury Farm	,,	—
Eldorado	—	—
Eldorado Mine	Nil	Nil
Golden Kopje Mine	—	—
Kanyemba	Nil	—
Lone Cow Estate	—	—
Longmead	Nil	Nil
Palm Tree Farm	,,	,,
Sinoia	,,	,,
Sipolilo	,,	—
Umvukwe Ranche	—	—
Makoni—		
Chimbi Source	—	—
Eagle's Nest	Nil	Nil
Ellavale	,,	0·10
Inyanga	—	—
Inyazura	Nil	0·09
Mona	,,	Nil
Monte Cassino Mission	,,	,,
Odzi (Railway)	,,	—
River Junction	—	—
Rusape (Railway)	Nil	—
Rusape	—	—
Rupurara	Nil	0·17
Springs	,,	0·25
St. Trias' Hill	,,	0·33
York Farm	—	—
Mangwendi—		
Bonongwe	Nil	0·09
Glen Somerset	,,	Nil
Huish Estate	,,	0·12
Land Settlement Farm	,,	Nil
Macheke (Railway)	,,	—
Marandellas	—	—
Marandellas (Railway)	Nil	—
Mrewa	—	—
Mtoko	Nil	—
Mungo	—	—
Selous Nek	Nil	—
Theydon	,,	Nil
Tweedjan	,,	,,

RAINFALL—(*Continued*).

Station	July	August
Mashonaland—(Continued)		
Mazoe—		
Avonduur	—	—
Bindura (Railway)	Nil	—
Bindura	,,	Nil
Ceres	,,	,,
Chipoli	—	—
Claverhill	—	—
Dunmaglas	—	—
Fairview	Nil	Nil
Jumbo	,,	—
Kilmer	,,	Nil
Laguaha	,,	,,
Lowdale	—	—
Mazoe	—	—
Melfort Estate	—	—
Mount Darwin	Nil	Nil
Omeath	—	—
Ruia	Nil	Nil
Ruoko Ranche	—	—
Shamva	—	—
,, Mine	Nil	Nil
Sleamish	—	—
Stanley Kop	Nil	Nil
Sunnyside	,,	,,
Teign	,,	,,
Umvukwe Flats	—	—
Waterfall Farm	—	—
Melsetter—		
Chikore	0·35	0·25
Chipinga	0·50	0·61
Helvetia	1·50	—
Melsetter	0·27	0·17
Mount Selinda	0·59	—
Mutambara Mission	0·03	—
Pasture	Nil	—
Tom's Hope	0·94	0·32
Vermont	1·39	—
Salisbury—		
Ardbennie	Nil	Nil
Avondale	,,	,,
Botanical Experiment Station	—	,,
Brookmead	Nil	,,
Chishawasha	0·02	,,
Cleveland Reservoir	Nil	,,
Forest Nursery	,,	,,
Glenara	,,	,,
Goromonzi	,,	,,
Gwebi	,,	,,
Hillside	—	—
Lilfordia	0·20	
Salisbury (Agricultural Department)	0·02	—

RAINFALL *(Continued).*

STATION	July	August
MASHONALAND—(Continued)		
Salisbury—continued		
Salisbury (Club)	Nil	Nil
,, (Gaol)	0·02	—
,, (Railway)	Nil	Nil
Sebastopol	,,	,,
Selby	—	—
Stapleford	—	—
The Meadows	—	—
Westridge	Nil	Nil
Umtali—		
Chiconga's Location	Nil	0·11
Odzani	0·01	0·43
Penhalonga	0·20	1·25
Premier Estate	Nil	0·12
Public School	—	0·27
Stralsrund	Nil	0·09
Summerfield	0·13	—
Umtali (Railway)	—	—
Utopia	0·33	0·61
Victoria—		
Bikita	0·51	0·86
Chibi	—	—
Chilimanzi	—	—
Chingombe	Nil	0·12
Chiredzi Ranche, Ndanga	0·37	0·01
Clipsham	—	—
Elephant Hill	—	—
Empress Mine	0·05	Nil
Eythorne	0·04	0·06
Fairburn	Nil	0·05
Fort Victoria	0·04	—
Gokomere	0·04	0·03
Gutu	—	—
Makorsi River Ranche	0·14	0·04
Marah Ranche	Nil	Nil
Marthadale	—	—
Morgenster	0·44	0·18
Ndanga	0·26	0·23
Pamushana	Nil	0·15
Silver Oaks	0·02	0·02
Tokwe River Ranche	—	—
Victoria	Nil	Nil
MATABELELAND:		
Belingwe—		
Albany	Nil	Nil
Anglo-French Block	—	—
Filabusi	—	—
Fort Rixon	—	—

RAINFALL *(Continued).*

Station	July	August
MATABELELAND—(Continued)		
Belingwe—continued		
Infiningwe	Nil	Nil
Insiza South	—	—
Insiza (Railway)	Nil	—
Mooifontein	—	—
Shangani (Railway)	Nil	—
Tamba	1·10	—
Thornville	Nil	Nil
Wedza	0·29	0·05
Bubi—		
Inyati	0·04	Nil
Leighton Farm	—	—
Lochard Experiment Farm	—	—
Bulalima—		
Figtree	—	—
Mholi (late Magot)	0·08	—
Marula	Nil	—
Plumtree School	—	—
Riverbank Farm	0·07	—
Solusi Mission	0·06	Nil
Syringa	0·06	,,
Tegwani	0·07	,,
Bulawayo—		
Balla Balla (Railway)	0·03	—
Bembesi (Railway)	Nil	—
Bulawayo (Railway)	—	—
Crombie's	0·10	Nil
Edwaleni	Nil	—
Essexvale	,,	Nil
Government House	0·03	—
Gwaai (Railway)	0·02	—
Heany Junction (Railway)	Nil	—
Hope Fountain	0·11	—
Imbesu Kraal	0·01	—
Impondemi	—	—
Keendale	0·02	Nil
Khami	0·01	,,
Lower Rangemore	0·06	,,
Matopo Mission	0·07	—
Maxim Hill	—	—
Melinakanda Junction	—	—
Nyamandhlovu (Railway)	0·11	—
Observatory	0·04	—
Raylton	0·12	—
Rhodes Matopo Park	0·05	Nil
Umgusa	Nil	—
Umkien	—	—

RAINFALL *(Continued)*

STATION	July	August
MATABELELAND—(Continued)		
Gwanda—		
Antelope Mine	0·16	—
Gwanda (Gaol)	0·13	Nil
,, (Railway)	0·15	,,
Malundi	—	—
Mtshabzi Mission	0·15	0·01
West Nicholson (Railway)	0·07	—
Gwelo—		
Coppy Nook	Nil	—
Globe and Phœnix (Railway)	,,	—
Gwelo (Gaol)	,,	—
Gwelo (Railway)	,,	Nil
Hagley	,,	—
Indiva Farm	—	—
Lalapanzi	—	—
Lalapanzi (Railway)	Nil	Nil
Lower Gwelo	,,	,,
Que Que	,,	,,
Rhodesdale Estate	,,	,,
Selukwe (Railway)	0·28	0·18
Sikombela Farm	—	—
Umhlali Farm	—	—
Woodendhose	Nil	0·02
Mafungabusi—		
Gokwe	—	—
Inyoka	—	—
Mangwe—		
Empandeni	0·15	—
Garth	0·22	Nil
Tuli—		
Lamulas	0·65	Nil
Langalanga	0·70	,,
Makalali	0·53	,,
Manantji	1·03	,,
Mazunga	0·70	,,
M'pande	0·67	,,
Tuli	1·13	,,
Wankie—		
Bombusi	Nil	Nil
Guyo	—	—
Malindi (Railway)	Nil	—
Victoria Falls	,,	Nil
Victoria Falls (Railway)	,,	—
Wankie Hospital	,,	—
Wankie (Railway)	,,	—

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1915		
			October	November	December
Bembesi	Queen's Mine Hotel	V. C. Andrews	1	5	3
Bindura	Bindura	A. C. Mills	9	..	11
Charter—Mgezi	Beatrice Mine	W. Krienke	27	24	29
Central	Umvuma	B. M. Yorke	30	..	..
Eastern Border (South Melsetter)	Various farmhouses	J. W. Scott	6	3	1
Enterprise	Arcturus Hotel	J. Watson	6	3	1
Felixburg	Felixburg	R. H. Brown	30	27	..
Figtree Branch, R.L. and F.A.	Figtree Hotel	W. H. Robertson	2	..	4
Gatooma	Gatooma	T. J. Golding	16	20	18
Gazaland	Chipinga	W. Wood	30	27	25
Greystone	Roodeheuvel Farm, Shangani	J. W. Spencer	9	13	11
Hartley	Hartley	J. de L. Nimmo	9	13	11
Headlands	Headlands	J. M. Harvard	30	27	25
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. H. Twilley	9	13	11
Insiza—Shangani	Shangani	N. C. St. J. Brislin	..	6	..
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	9	13	11
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	9	13	11
Lomagundi	Sinoia	W. Abbott	16	20	18
Macheke	Macheke	W. J. K. Webster	No	dates fixed	
Makwiro	Makwiro	T. R. McLellan	15	19	17
Marandellas	Marandellas Farmers' Hall	E. P. de Kock	2	6	4
Mangwendi	Mangwendi	Luke Green	..	..	..
Makoni	Rusape	H. Barnes Pope	2	6	4
Marula	Marula Siding	Mac. W. Ingram	23	27	25
Mashonaland	Commercial Hotel, Salisbury	J. Reid Rowland	6	3	1
Matopo Branch, R.L. and F.A.	Sibali	W. Bathurst	..	10	..
Mazoe	Glendale Siding	R. S. Newett	13	10	8
Melsetter (North)	Various farms	Rev. R. Wodehouse	..	..	4
Midlands	Gwelo	P.O. Box 23, Gwelo	9	13	11
Northern Umtali	Farm "Summerfield"	R. O. H. Blurton	..	6	..
Norton and District	Norton Siding	T. A. Osler	2	6	4
Que Que	Que Que	E. J. Ross	16	20	18
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	29	26	31
Shamva	Shamva	J. M. Moubray	No	dates fixed	
Selukwe	Selukwe	F. S. Clark	No	dates fixed	
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	13	..
Umvukwe	Various ranches	H. K. Bracewell	16	13	11
Umtali	Christmas Pass Hotel	J. S. Holland	2	6	4
Victoria	Victoria	H. S. Hoatson	20	17	15
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	9	13	11

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a ¼ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, i

which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Farm Seeds

The undermentioned seeds grown on the Government Experiment Farms are now available for sale at the prices stated. The prices are f.o.r. Salisbury, or, when available from the Lochard Experiment Farm, f.o.r. Bembesi.

All orders for seed must be addressed to the Government Agriculturist, Department of Agriculture, Salisbury.

(1) *Specially* selected seed maize, Salisbury White, Hickory King 10 row and Hickory King 8 row, 15s. per 100 lbs.

(2) Selected seed maize of the above varieties, 12s. 6d. per 100 lbs.

The above shelled seed has all been carefully selected, tipped, butted and hand-shelled. Supplies are limited, and in order to meet the large demand, not more than one to two bags can be supplied to each applicant.

(3) Japanese and silver-hulled buckwheat, 10s. per 100 lbs.

(4) Dhal, 3d. per lb.

(5) Black sunflower seed, 2d. per lb.

(6) Victoria and Yellow Cross wheat, 15s. per 100 lbs.

(7) White flowering and large seeded linseed, 4d. per lb.

(8) Spanish and Virginia bunch ground-nuts, 20s. per 100 lbs.

(9) German and Japanese millet, 3d. per lb.

(10) Teff grass seed, 3d. per lb.

(11) Feterita kafir corn (new introduction), 15s. per 100 lbs.

(12) Napier fodder roots, 5s. per 100, £2 per 1,000.

All orders must be accompanied by remittances for the full amount of seed ordered, and in cases where delivery is to a siding, the amount of railage must be added. Should it be found impossible to complete any order, the balance of cash will be refunded to the purchaser.

Co-operative Seed Distribution

The following seeds of summer crops are offered f.o.r. Salisbury for trial under the usual terms of co-operative experiments. The experimenter is required at the close of the season to forward to the Agricultural Department, on forms supplied for that purpose, an accurate report of the result of his experiments.

Seed is supplied in sufficient quantity to sow from ¼ to 1 acre according to variety, and not more than four varieties can be sent to any one applicant. All applications, together with full particulars regarding forwarding, should be addressed to the Government Agriculturist, Department of Agriculture, Salisbury.

1. *Summer Cereals.*—Victoria Wheat and other varieties of summer wheat, Burt, Smyrna and New Zealand Oats, and improved varieties of Rice.

2. *Oil Seeds.*—Linseed, Castor Oil, annual and perennial, Sunflower, black Russian, and Ground-nut varieties.

3. *Leguminous Crops.*—Velvet Beans and Dhal.

4. *Hay Crops.*—German Millet, Japanese Millet and Teff Grass.

5. *Root Crops.*—Mangel, Sugar Beet, Carrots and Cattle Radish.

6. *Fibre Crops.*—Hemp, Jute, Mauritius Hemp, Ramie and Sunn Hemp.

7. *Miscellaneous Crops.*—Japanese and Silver - hulled Buckwheat, Majorta Melon, New Zealand Spinach (vegetable), Rape and Cattle Kale.

8. *Pasture Plants and Grasses.*—Napier's Fodder slips, Paspalum, Sheep's Burnet, Tall Fescue and Beggar Weed (legume).

Forestry—Sale of Trees

The undermentioned varieties of trees will be available for sale from December onwards.

Price, f.o.r., Salisbury, 1d. each, 8s. 4d. per 100.

The following reductions are made on large orders on condition that the tins are returned. Otherwise they will be charged up at 3d. per tin :—

£3 per 1,000. £2 10s. per 1,000 for orders of over 5,000.

Average height of trees—3 to 9 inches.

Average number in tin—25.

Average weight of tin—25 lbs.

Belhambra.
Callitris calcarata—Cypress pine.
  do. robusta—Murray pine.
Casuarina leptoclada—Beefwood.
Cedrela toona—Toona.
Cupressus arizonica.
  do. sempervirens, var. pyramidalis—Churchyard cypress.
  do. sempervirens, var. horizontalis — Common cypress.
  do. torulosa—Himalayan cypress.
Dalbergia sissoo—Sissoo.
Eucalyptus amygdalina—Peppermint gum.
  do. botryoides.
  do. calophylla—White flowering gum.
  do. citriodora—Lemon-scented gum.
  do. corynocalyx—Sugar gum.
  do. crebra—Ironbark.
  do. leucoxylon.
  do. longifolia.
  do. melliodora—Grey box gum.
  do. microtheca—Coolibah gum.
  do. paniculata—Ironbark.
  do. robusta.
  do. rostrata—Red gum.
  do. saligna.
  do. salmonophloia.

Jacaranda.
Pinus halepensis—Aleppo pine.
do. longifolia—Chir pine.
Tristania conferta.
Thuya orientalis—Arbor vitæ.

Also in stock larger trees at 3d. each; average height of tree, 9 inches to 2 feet 6 inches; average weight of tins, 25 lbs.; number in tin, 4.

Fourcroya gigantea (Mauritius hemp), 1s. per 100.
Agave sisilana (Sisal hemp), 3s. per 100.
Paspalum, 5s. per 1,000 rooted slips.

Shrubs for Sale

Price, f.o.r., Salisbury, 6d. each. There is no guarantee to have any particular variety of shrub in stock, but everything possible will be done to supply the demand. Most of them are planted four in a tin, but there is usually a fair stock of single tins.

Red.

	Approx. height of growth.
Holmskioldia	8 ft.
Habrothamnos	5 ft.
Tecoma capensis	6 ft.
Hibiscus, single	8 ft.
do. double	8 ft.
Bottle brush	10 ft.
Russellia	3 ft.
Pomegranate	8 ft.
Bauhinia	8 ft.
Oleander	7 ft.
Euphorbia jacquiniflora	4 ft.
Sterculia—Coral tree	10 ft.
Plumieria (Frangipane)	8 ft.
Salvia	3 ft.
Cape May	3 ft.
Homelia patens	3 ft.

Pink.

Mallow	3 ft.
Lagerstrœmia flosregina	10 ft.
Alamanda	6 ft.
Sensitive plant	1 ft.

Blue.

Iochroma lanceolatum	10 ft.
Duranta	10 ft.
Plumbago	3 ft.
Heliotrope	3 ft.
Buddleia	6 ft.
Brunfelsia eximia—Natal violet	5 ft.
Rhodesian tree violet—Securidaca	15 ft.
do. lobelia	3 ft.
do. lupin	6 ft.
do. wistaria	20 ft.

White.

Spirea (Cape May)—4 varieties	4 ft.
Duranta	10 ft.
Lantana bush	8 ft.
Althea, single—"Xmas rose"	5 ft.
do. double	5 ft.
Gardenia	4 ft.
Plumbago	3 ft.
Bauhinia	8 ft.
Philadelphus	6 ft.
Deutzia	5 ft.
Moon flower	6 ft.
Magnolia	14 ft.
Plumieria—Frangipane	8 ft.
Oleander	7 ft.
Tree lupin	6 ft.
Pittosporum undulatum	7 ft.
Lemon-scented verbena	5 ft.
Rhodesian tree violet	15 ft.

Yellow.

Tecoma Smithii	10 ft.
Thevetia nerifolia	6 ft.
Cape jasmine	10 ft.
do. laburnum	10 ft.
Holmskioldia	10 ft.
Buddleia	10 ft.
Alamanda nerifolia	4 ft.
Streptosolon Jamesonii	3 ft.
Abutilon—"Chinese lantern"	8 ft.
do. —variegated leaf	8 ft.
Poinsettia	8 ft.
Cestrum aurantiacum	5 ft.
Hypericum—St. John's Wurt	4 ft.
Asclepias	3 ft.
Ribes	3 ft.
Naudina domestica	4 ft.
Galphinia nitida	4 ft.

Mauve.

Iochroma	10 ft.
Moon flower	4 ft.
Salvia	2 ft.

Climbers.

Golden shower—Yellow.
Bignonia tweediana—Yellow.
Clitoria ternata—mussel shell creeper—Blue.
Potato creeper (Solanum Wenlandii)—Blue.
do. small variety—Blue.
Phaseolus caracalla—White.
Beaumontia—White.
Jasmine—White.
Podranea—Zimbabwe creeper—Pink.
Dutchman's pipe (Aristolochia sypho).

Applications together with remittances and full particulars regarding forwarding should be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to

be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to ''Veteran,'' Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which

may be brought under irrigation schemes, together with rough estimates of costs.

3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
No. 62. Services of Agricultural Engineer.
No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.
No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
No. 94. Second Report on Experiments, by J. H. Hampton.
No. 125. Subterranean Water, by W. M. Watt.
No. 153. Citrus Fruit Trees—From Seed to Grove.
No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.
No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.
No. 166. Rhodesian Citrus Fruits—Exportation to London.
No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.
No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.
No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.
No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.
No. 206. Hints on Irrigation : Small Earthen Storage Reservoirs, by W. M. Watt.
No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.
No. 212. Citrus Fruits in Rhodesia, by A. G. Turner.
No. 216. Useful Measurements of Maize, by J. A. T. Walters, B.A.
No. 218. Manuring of Maize on Government Experiment Farm, Gwebi, by A. G. Holborow, F.I.C.
No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.
Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
No. 106. Cultivation and Preparation of Ginger.
No. 126. Turkish Tobacco.
No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.

No. 138. **Tobacco Culture (Virginia)—Harvesting and Curing.**
No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.
No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.
No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.
No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.
No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.
No. 179. Buckwheat, by H. G. Mundy, F.L.S.
No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.
No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.
No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.
No. 194. Rye, by J. A. T. Walters, B.A.
No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.
No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.
No. 58. Onion Thrips, by R. W. Jack, F.E.S.
No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.
No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.
No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.
No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.
No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.
No. 147. Root Gallworn, by R. W. Jack, F.E.S.
No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.
No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.
No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.
No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.
No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.
No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.
No. 178. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.
No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.
No. 197. Chafer Beetles, by R. W. Jack, F.E.S.
No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.
No. 214. Some Household Insects, by R. Lowe Thompson, B.A.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.
No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.

No. 74. The Detection and Prevention of Diseases of Stock in Rhodesia, by Ll. E. W. Bevan, M.R.C.V.S.

No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.

No. 95. Oestrus-ovis in Sheep, by Alec King.

No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.

No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.

No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.

No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.

No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.

No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.

No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

No. 215. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.

No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.

No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.

No. 163. Feeding and Care of Imported Cattle, by R. C. Simmons.

No. 167. The Construction of Dipping Tanks for Cattle.

No. 169. The Breeding and Feeding of Pigs for Bacon Factory Purposes, by R. C. Simmons.

No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.

No. 208. Water in the Diet of Live Stock, by Ll. E. W. Bevan, M.R.C.V.S.

No. 210. The Care and Feeding of Calves in Dairy and Stud Herds, by R. C. Simmons.

No. 211. The Fattening of Pigs on Granite Farms in Mashonaland, by R. C. Simmons.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.

No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.

No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.

No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.

No. 150. Dry Season and Droughts in Rhodesia, by the Rev. E. Goetz, S.J.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 157. Hints on Brickmaking, by G. T. Dyke.

No. 159. Gwelo Creamery : Hints and Suggestions to Farmers, by W. G. Elliott.

No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

No. 205. Home Butter Making, by R. C. Simmons.

No. 213. Hydraulic Rams, by W. Martin Watt.

No. 217. Windbreaks and Hedges, by F. B. Willoughby.

Malarial Fever : How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

The Prevention and Treatment of Blackwater Fever, by Dr. A. M. Fleming.

Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law : Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc

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HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

D. & R.—Farm assistant; £5 per month and food.

W. T. S.—Energetic young man as assistant on mixed farm in Midlands district.

A. H.—For gentlemanly young man of from 16 to 20 years of age to learn stock farming, etc.

W. H. E.—Young man as learner on fruit and dairy farm; one who can speak native language preferred. Board and lodging in exchange for services.

A. S.—For young Britisher as learner and assistant on large progressive stock and mixed farm near Salisbury. Board, etc., and possible small remuneration in exchange for services.

SITUATIONS WANTED.

P. G. C.—As manager of farm. Experience in all branches of farm work.

W. E. R.—Employment wanted in pruning trees. Thoroughly experienced; worked in California and with Mr. Pickstone, Cape Colony.

W. E. P. N.—As assistant on farm. Good practical experience. At present residing at Christiana. Would like fare paid, which can be deducted from salary.

C. S.—As assistant on farm. Six years' experience with cattle and general farming in Cape Colony.

J. L.—As assistant on farm; general knowledge of agriculture and good cattle hand; experienced in brick-laying, carpentering, fencing, etc. Good references.

F. R. T.—As manager on farm; thoroughly experienced in mixed farming; 29 years in South Africa and 7 years in Rhodesia; good references. Salary, £6 per month and everything found; percentage of crops.

E. S. M.—Position as creamery manager or butter maker; experienced, holding good references. Englishman.

G. A. M.—As farm manager; experience includes practical work with stock, fruit, mixed farming, building, fencing and machine repairs.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:*—

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:*—

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed

by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 247 of 1915.] [23rd July, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 526 of 1914, 167, 175 and 179 of 1915, and in terms of section 12 of Government Notice No. 50 of 1912, declare the following to be areas of infection and guard areas :—

1. SALISBURY AND MAZOE NATIVE DISTRICTS.

(a) *Areas of Infection.*

(1) M.T.C., Gallagher's Lease, Makabusi, Epworth, Adelaide and Glenwood Farms.

(2) Sternblick Farm.

(3) Bluff Hill Farm.
(4) Tynwald Farm.
(5) Sigaro Farm.
(6) Mabelreign Farm.
(7) Borrowdale Estate, Helenvale, Glen Lorne, Luna and Carrickcreagh Farms.
(8) An area bounded by and including the following farms :—Belford Estate, Belford Estate No. 2, Belford Estate North, vacant land on which the Jumbo Mine is situated, Whitfield, Yarrowdale, 100 acre lots, Tjibakwe and Belford Estate No. 3.

(b) *Guard Area.*

An area bounded by and including the following farms :—Bitton, Syston, The Lily, Killiemore, Penrose, Derry, Glen Lussa, Rainham, Gillingham, Park Ridge, Crowborough, Lochinvar, eastern sub-division of Willowvale, Glen Norah, Hopley, Saturday Retreat, Reserve, Odar, Stoneridge, Eyrecourt, Boutelle, Twentydales, Nalire Reserve, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Moo Leegte and Reserve.

2. UMTALI NATIVE DISTRICT.

(b) *Guard Area.*

The farms N'odzi and Nyagari and the Penhalonga Valley.

3. MELSETTER NATIVE DISTRICT.

(a) *Areas of Infection.*

(1) Highlands, Rockwood and Joppa Farms.
(2) Clearwater, Nooitgedacht, Randfontein and Avontuur Farms.
(3) Enhoek, Ravenswood, Roslyn, Woodstock, Landsdown, Heilrand and Kenilworth Farms.
(4) Wolvedraai Farm.
(5) Houtberg Farm.
(6) Springfield Farm.

(b) *Guard Area.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nayanyadzi River.

No. 283 of 1915.] [20th August, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard areas :—

(a) *Area of Infection.*

The farm Quagga's Hoek, in the native district of Melsetter.

(b) *Guard Areas.*

(1) That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

(2) That portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 381 of 1914.]

[3rd September, 1914.

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of this Notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe and Gwanda.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 527 of 1914.]

[31st December, 1914.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the 1st day of January, 1915, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including the Salisbury native district bounded by and including the following farms:—Lilfordia, Saffron Walden, Kilworth, Porta. Outspan, Clements' Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Odar Outspan, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Caledonia, Hartmans, Chishawasha, Glenlorne, Borrowdale, sections 4 and 1, The Willesden, Lowdale, Ingleborough, Mguta, Great B, Umsasa, Springvale, Passaford, Spa, Fairview, Nalire, Penrose.

No. 70 of 1915.]

[4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms:—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar,

Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 206 of 1915.] [25th June, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

All surveyed farms in the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge and Biriwiri, including the Ingorima Reserves and Mafusi Reserve, and excluding the farms Umzelezwe, Nyagadzi, Mhungura, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera.

No. 271 of 1915.] [13th August, 1915.

COMPULSORY DIPPING OF CATTLE: ENTERPRISE SECTION OF SALISBURY DISTRICT.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before 8th October, 1915.

Description of Area.

An area bounded by and including the following farms:—Halstead, Mount Shannon, The Meadows, Ivordale, Ivanhoe, Oribi, Colga, Neptune, Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley, Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chishawasha, Stuhm, The Springs, The Grove and Umritsur.

No. 309 of 1915.] [27th August, 1915.

COMPULSORY DIPPING OF CATTLE: MELSETTER AND UMTALI DISTRICTS.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have, by a majority of votes, requested His

Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before 28th October, 1915.

Description of Area.

All surveyed farms and the Ingorima and Mafusi Reserves in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali: Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrew's, Cronley and Lisnacloon.

No. 318 of 1915.] [3rd September, 1915.

AFRICAN COAST FEVER. COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri, and the Nyanyadzi River; and that portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 337 of 1915.] [17th September, 1915.

ENZOOTIC ABORTION.

IT is hereby notified for public information that nothing contained in the several Government Notices declaring certain areas to be actively infected with the disease known as enzootic abortion, for the purposes of the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amending Ordinance, 1911," shall be taken to prohibit the movement of oxen to, from or through such areas, subject to compliance with the laws and regulations governing the movement of cattle.

No. 505 of 1914.] [10th December, 1914.

CLOSING OF GATES ON ROADS, ETC.

UNDER and by virtue of the powers vested in me by section 26 of the "Fencing Ordinance, 1904," I do hereby provide that travellers passing through a gate erected on a public or private road in terms of section 25 of the said Ordinance, and omitting to close such gate after having passed through, shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address...
2. Number and Class of Cattle to be imported..
3. Area or Farm and District where Cattle are at present located..............
....
4. Area or Farm and District to which Cattle are to be moved.................
....

Applicant's Signature...

Date...................................

Application...........................

Permit No............................

ANNEXURE "B."

I, ... residing on the farm .... in the district of .... do solemnly and sincerely declare that the .... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals .... Bulls .... Heifers ....
Breed ....

Seller's Name and Address ....
....

Purchaser's Name ....

Place in Southern Rhodesia to which animals are being sent
....

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at .... on this .... day of.................. before me,

....

Resident Magistrate for the District of ....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London
Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, ETC.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries :—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route.*

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals, nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date................................., 19...

Place ....

....

Signature of

Government Veterinary Surgeon.

Number and general description of animals :

...............Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent :

....

Owner's name and address :

....

....

Place in Southern Rhodesia to which it is desired to send the animals ....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at ....
in the district of... .... in the..............................
Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to..................................† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at...on this..............
day of...before me.

....
Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent.................................
Owner's name and address...
....
Place in Southern Rhodesia to which animals are being sent.......................

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the under mentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.
Gwanda.
Plumtree.
Fort Rixon.
Belingwe.
Inyati.
Fort Usher.
Mphoeng's.
Holi.
Filabusi.
Gwaai.
Figtree.
Umvuma.
Que Que.

No. 375 of 1912.] [28th November, 1912

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches; and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Open areas.

The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following areas in the Hartley district and the Sebungwe district until further notice.

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

Sebungwe District.—From the confluence of the Sengwe and Lutope Rivers up the Lutope to its headwaters, thence in a south-east and easterly direction following the southern edge of the escarpment, leaving Meare's farm to the south, to the Mafungabusi Peak, thence northwards along the escarpment to the Njelele River, and down that river to its confluence with the Sanyati River, thence northwards down the Sanyati River to its confluence with the Piriwiri River, thence direct in a north-westerly direction to Picaninyemba, and thence along the footpath to Nenyunka on the Sengwe River, thence southerly up the Sengwe River to its confluence with the Lutope.

Lomagundi.—An area bounded by a line drawn from the junction of the Angwa and Mkwichi Rivers up the Angwa to the point where the Sinoia-Urungwe Road crosses that river; thence along this road in a south-easterly direction to the Hunyani River; thence down that river to a point opposite Mokore Hill; thence westerly direct to the point first named.

Elephants, Hartley District.—Notice No. 168 of 1914 permits the shooting or capturing of elephants on or within five miles of the farm Walden, in the Hartley District, for a period of one year from 9th April, 1914.

The game specified may be shot in these open areas without a licence.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

No. 390 of 1912.] [19th December, 1912.

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds:—

(1) Great Locust Bird or White Stork (*Ciconia alba*);

(2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*);

(3) Small White Heron or Cattle Egret (*Bubulcus ibis*);

(4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 171 of 1915.] [21st May, 1915.

PROTECTION OF GAME ON COMMONAGES.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that up to the 30th day of April, 1916, all game within the limits of the commonage or townlands of Umtali shall be strictly protected, and shall not be hunted or destroyed.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 287 of 1915.] [27th August, 1915.

AGRICULTURAL STATISTICS.

UNDER and by virtue of the powers conferred on me by the "Agricultural Statistics Ordinance, 1914," I do hereby cancel Government Notice No. 399 of 1914, as amended by Government Notice No. 496 of 1914, and make the subjoined provisions for the collecting of statistics or estimates in terms of the said Ordinance.

1. Statistics shall be collected by the Director of Agriculture in relation to crops, citrus fruits, irrigations, fencing and dipping tanks.

2. The form set out in the annexure hereto shall be used for the purpose of collecting such statistics, and should be completed in accordance with the instructions accompanying the same, by all persons in charge of farms or estates, whether as owners, lessees, managers, servants or occupiers or acting on behalf of such persons, and transmitted to the Director of Agriculture not later than the date fixed in the instructions accompanying the said form.

3. Any person who without reasonable cause makes default in complying with the requirements of the last preceding section shall be liable on conviction to a fine not exceeding fifty pounds, or in the case of a continuing default to a fine not exceeding one pound for every day during which the default continues.

ANNEXURE.

Crops already Harvested, Season 1914-15.

	Acres under crop.	Total yield.	Amount reserved for home consumption and seed.
Maize	......	......bags of 203 lbs.	......bags of 203 lbs.
Kaffir corn	......	......bags of 203 lbs.	......bags of 203 lbs.
Monkey nuts	......	......bags of 83 lbs.	......bags of 83 lbs.
Potatoes	......	......bags of 153 lbs.	......bags of 153 lbs.
Sunflower	......	......lbs. net	......lbs. net
Wheat (Summer)	......	......bags of 203 lbs.	......bags of 203 lbs.
Tobacco	......	......lbs. net	......lbs. net
Ensilage	......	......No. of tons	
Other crops for grain	......	....	....
Other crops for fodder	......	....	....

Citrus Fruits.

Orange trees ...	...	No. bearing......	No. not yet bearing......
All other citrus trees	...	No. bearing......	No. not yet bearing......

Prospective Crops yet to be Harvested during 1915.

	Acres under crop.	Estimated yield.
Potatoes	....	...............bags of 153 lbs.
Wheat (Winter)	....	.... ,, 203 lbs.
Other crops	....	....

Irrigated Land.

Gross area under irrigation ... ...acres

Source of water supply (whether from stream, well, storage dam, etc.) ... ...

Nature of works (whether by gravitation or pumping, or by a combination of both) ... ...

N.B.—If any of the above-mentioned crops have been grown under irrigation, please state the fact.

Fencing.

Boundary fencing (*i.e.*, separating the farm from its neighbours) ... ...miles

Inner fencing (*i.e.*, separating portions of the farm itself) ....miles

Dipping Tank.

Please state whether there is a dipping tank on your farm.......................

Name* of farm (or farms) covered by the above return—

....

Signature................................

Full postal address............................

....

N.B.—For the purpose of calculating the acreage, please note that the length multiplied by the breadth, in yards or paces, divided by 4,840, equals number of acres. That is, roughly, 70 x 70 yards or paces, or 60 x 80, or 50 x 97, or 40 x 121, equals one acre.

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*That is, the original and officially-recognised name which appears on the title deeds and diagrams.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits
Bread
Butter
Confectionery
Cigarettes
Dried & Bottled Fruits
Dried Meats
Eggs
Flour
Flowers
Honey
Jam
Plants
Poultry
Seeds
Sugar
Tobacco
Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. EYRE,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

RHODESIA

Agricultural Journal.

ISSUED BY

The Department of Agriculture,

SALISBURY, RHODESIA.

ADVERTISEMENTS.

The Journal is issued every alternate month.

Application for advertising space should be addressed to the Editor. The rates are as follows, *per issue*:—

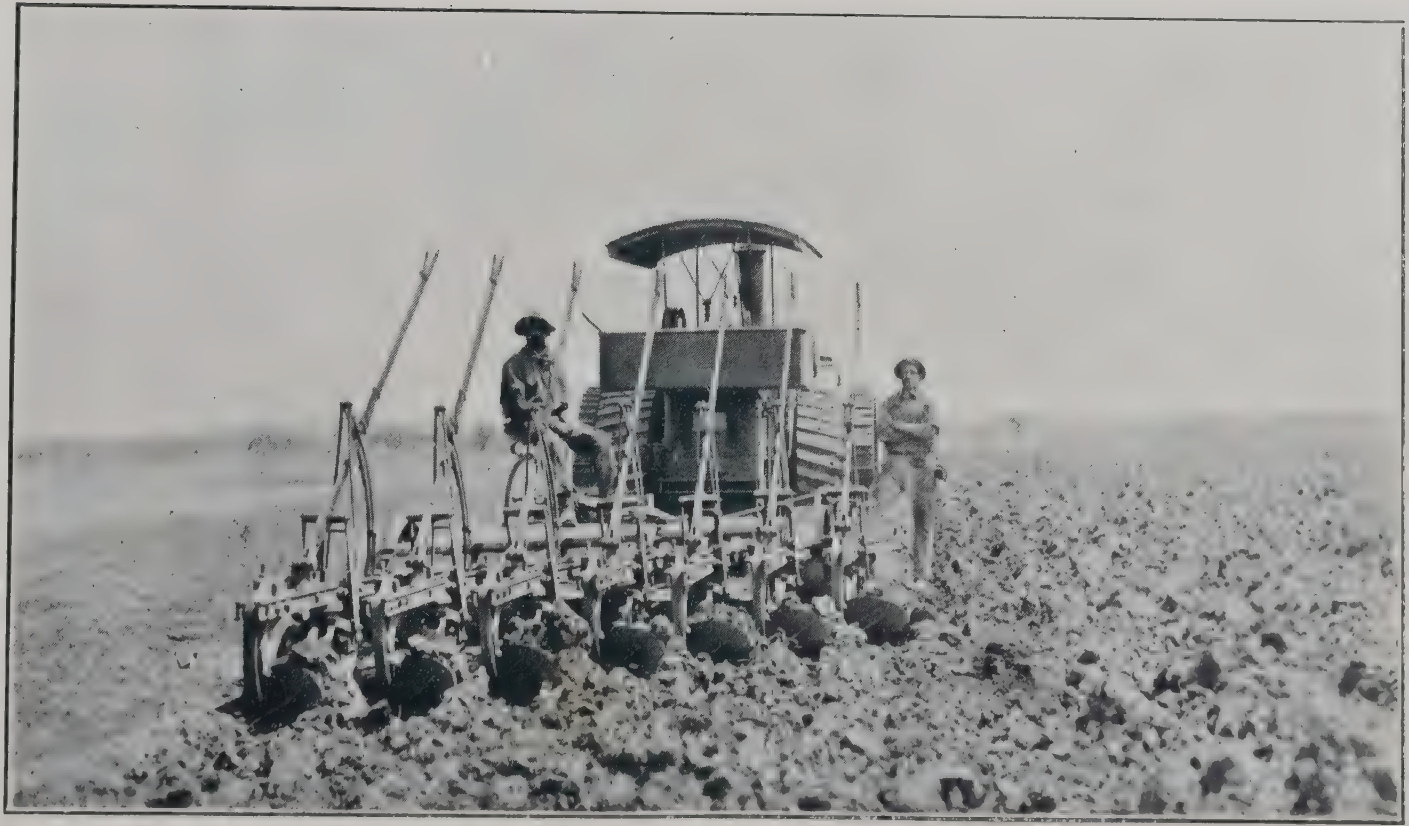
Position.	Whole page.			Half page.			Quarter page.		
	£	s.	d.	£	s.	d.	£	s.	d.
Inner pages	2	0	0	1	5	0	0	15	0
Outer cover (back)	4	0	0		—			—	
Inner covers (back and front) and page facing Contents	3	0	0	1	15	0	1	0	0

A discount of 10 per cent. will be allowed for standing or consecutive advertisements running through six issues. Remittances, and electros where desired, should accompany orders. The right is reserved to discontinue the insertion of standing or consecutive advertisements should payment beyond the second issue be delayed.

The right of approval of all advertisements by the Director of Agriculture is reserved, and his decision as to the acceptance or rejection is final.

An additional charge may be made for advertisements printed in special type, equal to any additional charges made by the printers for setting up same.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock or farm implements, at a minimum charge of 2 6 per insertion of 20 words. Extra words will be charged for at the rate of 1/- for every 10 words.



Robey's Steam Tractor, Matabeleland.

THE RHODESIA

Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

PUBLISHED BI-MONTHLY.

VOL. XII.—NO. 6.] DECEMBER, 1915. [5s. per annum.

Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

RESULTS OF EXPERIMENTS.—In this issue will be found reports of the results of experiments being carried on at our two experiment stations, namely, at Gwebi Farm, Mashonaland, and at Longila Farm, Matabeleland. The former includes the several kinds of soil typical of the Gwebi Flats, and experiments thereon may be taken as a fair guide as to what can be done on a large area of similar land in Mashonaland, while the richer valley districts, such as Mazoe, may generally be expected to exceed Gwebi records. Longila Farm, on the other hand, consists of the sandy soil characteristic of so much of Matabeleland, so that experiments there should form a reasonable criterion of the possibilities of that class of land throughout the country. We trust that the length of these reports as a whole, together with the necessarily brief and uncoloured descriptions of the great numbers of trials made, will not deter farmers from reading them through with care. We would point out that not only does the scale of our experiments increase annually, making them more usefully comparable with ordinary farm work, but at the same time year by year the direct value of the trials made grows by a cumulative process, because each season's evidence of results is added to all that has gone before, so that early opinions may be modified and average results become more reliable. In this connection, it should be remembered that negative results (failures) may often be as instructive as positive successes.

Loans for Dipping Tanks.—The Compulsory Dipping Ordinance, 1914, is of a permissive nature, and provides for what is practically a system of local option in respect to compulsory dipping, in the same way that the Fencing Ordinance provides for compulsory fencing, that is, it only becomes applicable to a district when the landowners in that district desire and request it in the terms of the law. The following is extracted from section 2 of the Ordinance:—"If the owners in any area . . . shall by a majority of votes request the Administrator in writing to bring compulsory dipping into operation, the Administrator may, by notice in the *Gazette*, order compulsory dipping from such date as he may prescribe within the whole or any portion of such area."

The farmers of Rhodesia have not been slow to avail themselves of the opportunity opened by this Ordinance to protect themselves in the surest way known against the ravages of cattle diseases. Already several districts have made request to have compulsory dipping applied. The first was the Enterprise district, followed by Salisbury, Marandellas, Makwiro and Melsetter; while other petitions are, we understand, being prepared.

In these circumstances we may remind our readers that the Rhodesia Land Bank, Ltd., is still prepared to make small loans for the erection of dipping tanks. We are informed that the amount at the disposal of the Bank is limited, and consequently advances will only be made in cases of proved necessity. The Land Bank terms for such loans are as follows:—

(1) On the security of a first mortgage, bearing interest at the rate of 6 per cent. per annum, and repayable in terms here given. Interest payable half-yearly in advance on the 30th June and 31st December. All advances to be repaid within a period of ten years, or in a shorter period, as may be arranged. No advances on land not permanently occupied and beneficially worked. All costs payable by the borrower, including cost of inspection, if required. Fuller details will be furnished by the Land Bank to applicants.

(2) Amounts not exceeding £150 on the security of a promissory note, backed by two satisfactory sureties, and bearing interest at the rate of 7 per cent. per annum, for one year; the borrower to be given the option of renewing one half of the amount borrowed for a further term of one year on completion of a second promissory note for such half, backed by the same or equally good sureties.

We are also authorised to make the following announcement:—The Board of the British South Africa Company is prepared, in the exceptional conditions prevailing in the country, to consider applications for loans for the purpose of assisting in the construction of dipping tanks within areas in which the Compulsory Dipping Ordinance, 1914, has been made operative. The funds available for this purpose are limited, and it is only intended to assist those genuinely unable to find funds for the purpose in view. Land-holders who are so situated should make application to the Magistrate of their district, who will forward the same for consideration by a committee consisting of officers appointed by the Administrator to examine and deal with these loans. Advances will be made only in cases of proved necessity, and will be limited to an amount not exceeding £75, and adequate security will be required, either under section 5 of Ordinance 27 of 1914, or otherwise to the satisfaction of the committee. Repayment of the sum advanced, with interest at 7 per cent., will be required in equal annual instalments spread over a period of ten years.

Section 5 of Ordinance No. 27 of 1914 reads as follows:—

"Persons furnishing loans for the purpose of erecting

> dipping tanks may, with the consent of the owner, cause a notice in writing to be sent to the Registrar of Deeds of the amount due by such owner, and the Registrar shall make an entry thereof in respect of the land affected. Such entry shall constitute a hypothecation of the land, ranking from the date on which the entry was made, and for the amount therein stated; provided that the Registrar may pass transfer of land so hypothecated if the transferee agrees in writing that any sums due and unpaid shall remain and be registered as a charge against the said land."

Attention must be drawn to the following points:—The offer of the British South Africa Company is made in view of "the exceptional conditions prevailing in the country" at the present time. It is liable to be withdrawn when the funds set aside for this special purpose are exhausted, or when happier conditions obtain, and the necessity no longer exists. The offer is made only in respect to "areas in which the Compulsory Dipping Ordinance, 1914, has been made operative," but within such areas it is open to all farmers who are "genuinely unable to find funds for the purpose in view."

We feel sure farmers will appreciate the spirit in which the Company comes forward to help at this crisis, and if advantage is taken of it, it should go a long way towards removing the difficulties in the way of universal dipping wherever the compulsory dipping principle has been adopted.

IRRIGATION OF CITRUS ORCHARDS.—We publish in this issue a paper by Mr. W. H. Swain descriptive of the method adopted on the Premier Estate, Umtali, for the irrigation of citrus groves. The peculiar feature in connection therewith is the system of brick-lined distributing furrows which convey the water without loss and waste to the requisite points of delivery. This very satisfactory plan was suggested by the citrus expert, Mr. Turner, of the Department of Agriculture. Satisfactory and economical as is this system, the initial cost is, of course, a consideration, and a drawback in these hard times, but it will be observed that the estimate of cost shews bricks at 20s. per thousand, a figure which is perhaps not as low as possible, whilst the permanent advantages, convenience and economy are very material considerations at any time.

CATTLE ON SALISBURY SHOWS.—The unfortunate presence of African Coast Fever in Mashonaland, preventing as it does the exhibition of cattle of most classes on the various shows in that province, is naturally a serious drawback to the business of local stock breeders, whose advertising and selling facilities are for the time being much restricted. There is, however, one class of beast that does not suffer this disability, and that is slaughter stock. We are informed that the usual Christmas Fat Stock Show, conducted by Messrs. Whitfield & Co., is to be held on 15th December, when prizes to the value of over £80 will be given for all classes, ranging from slaughter bullocks to fat fowls. We believe there is likely to be keener competition than ever before for the big prizes. We may also mention early, so that breeders may have plenty of time to prepare, that the Rhodesia Agricultural and Horticultural Society has decided to hold the usual winter show next June or July, which will include a cattle section, necessarily limited to certain classes. We understand that the Society intends on that occasion to guarantee a certain minimum price per 100 lbs. for all cattle, so as to ensure a market for exhibitors' stock.

SILOS.—In this issue will be found an article written by Mr. Scorror of Marandellas, descriptive of a silo pit which he has erected there. This interesting paper raises the general question of the merits of pit silos, and silos built above ground, Mr. Scorror's being a combination of both systems.

Generally it may be said that in Rhodesia excellent silage can be prepared in simple holes dug in the ground, care being taken that the walls are vertical and smooth. This is, of course, impossible where rock comes near the surface, or where the ground readily becomes water-logged during the rainy season. In the former case silos above ground, or partially so, are indicated, and in the latter the pits must either be brick-lined and rendered water-tight, or above-ground silos again resorted to. Fortunately these unfavourable circumstances are of comparatively rare occurrence, and the very great majority of silos in this country are simple pits, round or rectangular, 10 or 12 feet deep and the same width, exceedingly cheap and convenient. In loose sandy soils, too, the simple unlined pit is also not suitable.

In favour of pits, it is to be pointed out that the silage is thrown in from ground level and only lifted in removal. In a pit of the Marandellas type, the raw material is lifted over the wall, both in filling and in extracting, at least until the hatch or doorway is reached. In the well-known American type of stave silo, built of timber above ground, a series of doors, one above the other, extends the whole height of the structure, thus obviating much of the labour of lifting. In Matabeleland, where ensilage is much more generally met with even than in Mashonaland, there are several brick cement-lined silos, and in some cases much needless expense has been incurred, but where structures of the kind indicated are found to be necessary, the hints given by Mr. Scorror, based on his experience at Marandellas, will no doubt be found very helpful.

Linseed Culture.—The following extracts, from a leaflet issued by the University of North Wales, should be of interest to Rhodesian growers of linseed:—" In continuation of trials carried out during the last four years, a small quantity of linseed, sufficient to sow a quarter of an acre, was supplied " to various farmers. " The following directions were sent with the seed, and give an idea of the details of cultivation of the crop:—The linseed should be sown in place of barley or oats." (That is, in the rotation.) "It may follow either roots or grass. The land should be clean, and in fairly good condition. The quantity of seed sent (20 lbs.) is sufficient for a quarter of an acre. Sow about the end of April." (That is, early spring.) "The seed may be sown broadcast or drilled. Cover very lightly, not deeper than half-an-inch. Grass seeds may be sown in the linseed if required. Linseed does not ripen like corn, but produces flowers and ripe seeds at the same time. It should be harvested when most of the flowers have formed pods.

and when the oldest pods are quite ripe and dry. It may be cut with a machine or scythe, and be tied into small sheaves like corn. As it sheds easily, it is better cut on a dewy morning. Stand it in stooks in the field, and carry when dry. Spread sacks or a sheet on the cart when carrying to catch the shed seed." After detailing the results of the various experiments with different varieties, and giving the yields in each case, the leaflet concludes as follows:—"There is no doubt that linseed can be satisfactorily grown in North Wales, and a crop of 8 to 9 cwts. of seed per acre may reasonably be expected. With the possibility of high prices for linseed in the near future, calf rearers would be well advised to grow a little. The straw for ordinary farm purposes is not so valuable as that of a corn crop, but it may be noted that it makes particularly good ropes for thatching."

SOIL VENTILATION.—Interesting, as confirming some remarks we made in last issue, is the latest report from the famous Rothamsted Experimental Station, England, on this subject. We quote from the annual report of the Board of Agriculture on Agricultural Education and Research:—"*Air Supply.*—Equally important with the water supply is the air supply in the soil; this has been under investigation. Periodical analyses, extending over nearly two years on several typical plots, have shewn that the free air in the soil spaces differs only slightly from the atmospheric air in regard to oxygen content; there is, however, a greater difference in carbon dioxide content. These results agree so closely with those obtained elsewhere, that we may regard the similarity of soil air to the atmosphere as generally true."

THE SOCIAL SIDE OF RURAL LIFE.—Now that young men, born on the land, are beginning to take hold of farm work in Rhodesia, it may be said that we are emerging from the pioneer stage, and agriculture is entering its proper sphere as an important and established part of the activity of the community. The pioneers of farming, and other industries, in a new country are men of initiative and determination, who are content to "rough it," and willingly forego many of the amenities of civilised life so long as they can see that they are making headway. It does not follow that the new generation will be actuated by the same spirit, and in all countries passing through a period of settlement, like ours, it is found that, after the first comers have fought to fix themselves on the land, and are happy when they have accomplished it, their children are frequently discontented, and complain of the hardness and monotony of rural life. This is the perilous time, when, for the happiness of the country people and the prosperity of all, it is urgent that something should be attempted to check the natural tendency of youth to drift away to the more exciting and varied life of the towns.

It may seem early days to moot this question in Rhodesia, but "a stitch in time." A notable example of what may be done in this direction is furnished by the National Grange of the United States. The Order of Patrons of Husbandry, popularly known as the Grange, was founded in 1867, and has been in existence for nearly fifty years. It reached the height of its power about 1874, and afterwards declined in influence and was in the shadow of obscurity till 1880. Since then, it has steadily recovered, until to-day it is said to have a membership of one-and-a-half million. Its temporary collapse was due largely to its endeavours to play a part in the "maelstrom of American politics," and its recovery dates from the time when it began to confine its attentions chiefly to various phases of the rural betterment movement.

The aims of the Grange to-day are mainly in the direction of social amelioration and the dissemination of agricultural knowledge. It also takes a keen interest in all educational matters. Its activities include picnics, or barbacues, where refreshments and all kinds of entertainment are furnished, and where the families of farmers learn to know one another. One of the officers of every Grange lodge is the "lecturer," whose business it is to provide for lectures, papers and discussions on all sorts of agricultural and other subjects.

The idea, with modifications to suit local conditions, may be recommended to our farmers. In countries like this, where the white population is sparse, and homesteads are placed at great distances from one another, the head of the household is apt to forget that, while his own constant occupation with farm work and his keen interest in the development of his property are sufficient to keep him busy and contented, the same does not always apply to the womenfolk and the young people. They feel the monotony and loneliness of rural life. No woman will be happy who does not have reasonable opportunity for intercourse with other women. Young people cannot be expected to settle contentedly in a life where they cannot mix with others of their own age. We do not suggest any ambitious imitation of the American Grange, but we believe it would be an excellent thing if social gatherings of farmers were more general and more frequent. We do not need to go beyond our own borders to see how successfully this kind of thing can be arranged, and how good are its results. We remember the Iron Mine Hill Gala of 1914, with its enjoyable combination of instruction and pleasure. The recent course of lectures at a Marandellas farm is another encouraging instance. Much might be done by increasing the number of small local shows, and by a definite effort to make the ordinary meetings of farmers' associations more useful and attractive. In the latter case, papers by members, with discussions, as well as lectures by experts, might be more often arranged, and other members of the family besides the farmer himself might be encouraged to attend, with advantage in the social direction. Too frequently three or four farmers travel long distances to meetings, only to find the attendance so small, and the agenda paper so uninteresting, that they feel the time has been almost wasted. District cattle sales sometimes extend over more than one day, and it would be a good idea if farmers arranged for their association meetings and their rifle club shoots to be held at the same time, or the next or preceding day. The example of Marandellas might be followed, and a course of lectures delivered during a week in country centres. The periodical holding of nachtmaal in other districts suggests an occasion that might be utilised in the way hinted at.

We believe it is sufficient to throw out the idea, and if farmers think it over, and are satisfied that there is something in it, they are quite capable of evolving plans to put their wishes into effect.

Farm Statistics.—The agricultural statistical returns relating to crops recently harvested have now come to hand, and are at present being collated. It is a matter of much gratification to find how readily, promptly and conscientiously the forms issued are being sent back with the desired information duly filled in. It is, of course, only by the willing co-operation of each individual farmer that the totals when compiled can be relied on as of real practical use. On that score, happily, there can be at present no doubt, for the way the information asked for is furnished and the unanimity of the response are most satisfactory. The results, in the form of totals and averages for districts and for the whole country, will be published as soon as possible.

Shortly after this *Journal* appears, the Director of Agriculture will send out further forms calling for particulars relating to numbers and description of live stock of all kinds on the farms at the end of the year, and the quantities of poultry, dairy produce and wool sold during the preceding twelve months; also a preliminary estimate of the crops for the season 1915-16 under three heads—total area under cultivation, area under maize, and area under tobacco. About the end of the wet season it is intended to make fuller enquiries as to crop prospects. It is hoped that these returns will be sent in promptly, and farmers are again reminded that no one but the Government Statistician has access to the figures for individual farms, and only totals are published for the general good of the farming industry.

Union is Strength.—We note with pleasure that the Marandellas and Mangwendi Farmers' Associations have recently decided to unite into one strong body. We believe this is a move in the right direction, for it is easier to maintain interest in the work of an association where there is a large number of members in a locality who can conveniently meet at a well-chosen centre. The group of men from whom leaders may be chosen, by its greater size, gives freer scope for selection, while concentration of energies gives increased effectiveness. We wish the new society all the success which, by virtue of the importance of the district it represents, it deserves.

Report on Crop Experiments at the Government Farm, Gwebi, Season 1914-15.

By Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

Manurial Experiments with Maize.—In addition to the experiments described in the August issue, page 498, of this *Journal* by Mr. Holborow, the Assistant Agricultural Chemist, several direct and simple experiments, such as every farmer might make on his own land, were carried out to elucidate certain points, and the results obtained will no doubt be read with interest, even in a season when the enhanced price of artificial fertilisers and the low price of mealies make the problem less immediately pressing than it is in normal circumstances.

Artificial Fertilisers for Maize.—To measure the effect of an average application of artificial manure, rather poor land, exhausted by continuous cropping to maize for several years, was selected. The previous year, in order somewhat to restore this land, a crop of velvet beans had been grown on it, and this no doubt had improved its condition, although it still remained chemically poor. For such land Hickory King is the variety of maize indicated. Thirty acres of land were set apart for the experiment, twenty acres receiving Rhodesian maize fertiliser at the rate of 100 lbs. per acre, and ten being left without, so that the final figures per acre may be regarded as a fairly accurate result, and the likelihood of error owing to peculiarity of ground, such as may arise when small plots are used, is eliminated.

The land was thoroughly well prepared in the usual way, the seed sown at the rate of 12 lbs. per acre, cultivated three times, and then earthed up with the wing shovel, a final hand-hoeing being given after the crop was too tall for animal culture. A careful note was taken of the growth of the crop from time to time. Sown between the 23rd and 27th of November, the plants came away well, and a good crop, bearing in mind the poverty of the soil, was early assured, although all along a distinct difference was observable between the fertilised and the untreated plots. The former shewed especially well during the first two months, and it was obvious that the fertiliser ensured to the crop a good start, a matter of such prime importance if, as is quite likely, the latter part of the season turns out unfavourably. Two months after planting the fertilised plot stood from 6 to 7 feet high, but the other only 3 to 5 feet. Another month later the former plot was still about ten days ahead of the other in its progress. The crop ripened in the middle of April, and when weighed out gave a return per acre of 1,916 lbs. for the fertilised land, 9½ bags, against 1,390 lbs., a short 7 bags, for that unfertilised, shewing a direct gain in grain of 526 lbs. for an outlay of 12s. 3d. on fertilisers.

An experiment precisely similar in aim but slightly extended, in that it compared two commercial fertilisers and dealt with a different class of soil, may now be described. In this case the soil was the red loam characteristic of the Gwebi Flats and many other parts of Rhodesia, naturally fertile, as the yield on the unmanured plot testifies, but yet responsive to artificial fertilisation. The plots were again large so as to avoid error; ten acres were untreated, five acres received double complete Safco maize fertiliser, and five acres got Rhodesian maize fertiliser, both applied at the rate of 100 lbs. per acre, and a cost respectively of 20s. and 12s. 3d. per acre. The whole area had been under wheat uniformly treated the previous year.

Sown on the 16th of November, and ripening during the first week in May, the entire crop, manured and unmanured, was good, but the former shewed a more even growth throughout. Wild pigs did some damage, but were apparently fairly impartial in their unsolicited attentions. The yield, calculated per acre, works out as follows :—

Untreated, 2,450 lbs.
Safco mealie fertiliser, 3,290 lbs., an increase of 840 lbs.
Rhodesian mealie fertiliser, 3,562 lbs., an increase of 1,112 lbs.

The advantage derived depends of course upon the price of the resulting increase, although we must also recollect that the residual value of the fertiliser will be felt on subsequent crops during the next two years.

Yet another trial of the same sort was made on naturally fertile ground, which the previous year carried a crop of velvet beans, and on which the maize consequently grew so luxuriantly as to render comparison difficult to the eye, although eventually the presence of the fertiliser was manifested in the bags. Sown under like conditions to the preceding plots, this crop was first harrowed with a Hallick weeder, twice cultivated and once hand-weeded.

Two plots were laid off, five acres each in extent, the one unmanured and 100 lbs. per acre of double complete Safco fertiliser broadcasted on the other. The yield was at the rate of 2,060 lbs. per acre on the unfertilised, and 2,575 lbs. per acre on the fertilised plot, a difference in favour of manuring of 515 lbs. per acre, at a cost of 20s., an increase of 20 per cent. on the crop.

Residual Effect of Kraal Manure.—The residual value of kraal manure was measured in a simple and direct way. Two plots of five acres each were taken. In 1913-14 the one had been under a crop of mangolds with six tons of kraal manure per acre, whilst the other, unmanured, but otherwise the same, was sown with majordas. In 1914-15 both plots were sown to Hickory King maize, with the result that the manured plot yielded 2,560 lbs. of grain per acre and the other 2,009 lbs., both good returns as a result of the previous fallow crop, but the former yielded a clear additional return of 551 lbs. per acre. Both plots received 100 lbs. of double complete Safco on the maize.

CULTURAL EXPERIMENTS.—*Ploughing.*—The following experiment is one of a simple and practical character which any farmer can repeat for himself with such modifications as he may desire to suit his own circumstances, and learn much that is of real practical use. Twelve acres of land were ploughed in four different ways, as shewn below, but in every other respect the land was treated identically. New land unmanured was specially chosen, and the crop handled in the usual manner. The results are, therefore, entirely the outcome of the different methods of ploughing pursued. Such experiments do not admit of a very general application, for this is essentially a point which must be determined separately for each piece of land, as it depends on the mechanical texture and the depth of the ground what particular treatment is most effective.

Ploughing Trials—Salisbury White Maize.

Plot No.	Treatment.	Yield per Acre.
1.	Twice disc ploughed	1,470 lbs.
2.	Once disc ploughed and once mouldboard	815 lbs.
3.	Once disc ploughed and afterwards ploughed with mouldboard, followed by sub-soiler	964 lbs.
4.	Once disc ploughed	602 lbs.

With reference to the above table, it may be well to explain that the ploughing was rather shallow, and, owing to the absence of late rains, the grass did not rot sufficiently to allow the mouldboard plough to do as good work as it would otherwise have done.

This is a useful lesson to farmers breaking new land, and especially to beginners, who are apt to aim at a large acreage rather than thorough preparation of the soil. Under conditions which are frequent in this country, land twice disc ploughed gave well over double the crop from land once ploughed. Again, the sub-soiling gave an increase of 149 lbs. per acre over land identically treated, but not sub-soiled.

Width of Drills.—Maize.—Yet a further experiment with Salisbury White maize may be mentioned. The general principle is that distance of planting varies with fertility of soil and method of subsequent cultivation. In practice, the best distance for a particular crop on a particular kind of soil can only be discovered by experiment. The plots contrasted were treated in every respect alike and the distance of plants in the rows was in all cases 18 inches; the land was not fertilised, and a maize crop had been grown on it the previous year, so that heavy yields were not looked for. The results are striking :—

Plot.	Width of Drills.	Yield per Acre.
1.	36 inches	2,024 lbs.
2.	42 inches	2,000 lbs.
3.	48 inches	1,400 lbs.
4.	54 inches	1,190 lbs.

Narrower drills are not practicable, owing to difficulties of cultivating between the rows. These results, of course, confirm common practice, but it is well to have good justification for what we do and believe to be right.

With Hickory King maize (eight-row) on rather poorer soil, a precisely similar result was obtained, as follows:—

Plot.	Width of Drills.	Yield per Acre.
1.	36 inches	1,610 lbs.
2.	42 inches	1,284 lbs.
3.	48 inches	825 lbs.
4.	54 inches	820 lbs.

Application of Fertilisers.—Another cultural experiment of some interest is a comparison between broadcasting the fertiliser by means of the Maybole Manure Distributor over the land immediately before sowing, or applying it in the row at time of planting through a fertiliser attachment on the seed drill. To this end two plots of Salisbury White maize were treated in the different ways indicated, but in every other respect with strict uniformity. Each plot was two acres in extent, and was treated with 105 lbs. per acre of Rhodesian maize fertiliser, sown at the rate of 10 lbs. of seed per acre, given a stroke of the Hallick weeder, and cultivated three times during the season. The two plots shewed little difference throughout growth, but when threshed out, the plot on which the fertiliser was broadcasted returned 1,665 lbs. per acre, as against 1,522 lbs. per acre for the plot on which the drill was used. Not a great difference, but still an increase worth securing by so simple a means. Before finally accepting this result as conclusive for all cases, it would be well to repeat it.

Although the increased yield is not very great, yet in practical use the advantages of using this mechanical distributor are so obvious that in applying fertilisers in the ordinary course, it is intended always to use this implement on the farm.

ROTATION EXPERIMENTS.—The aim of a rotation is, it must be remembered, not to produce the heaviest crop of maize when that crop is sown, but to secure the best financial results from each acre of ground cultivated over a series of years, and this can only be ascertained by several years of experiment. The inter-action of each crop on its successors is, however, the first step to the formulation of such rotations.

Before we can definitely determine suitable rotations of crops for Rhodesian conditions, many factors relating to the soil, to possible crops, commercial and industrial considerations, labour, transport, markets and seasons, have to receive attention. A primary point to settle is the influence of each crop on the succeeding one. A solution of this problem was sought as regards the effect of various crops on maize, and the following results obtained, which, subject to confirmation in future years, by repetition, appear reasonably conclusive.

A number of plots, which had borne the crops mentioned below during the season 1913-14, were all sown to maize in 1914-15, the land being well prepared, but unmanured, so as to avoid the complications which might arise from fertilisers clouding the direct issue.

The maize was planted between the 19th and 25th November, in the usual drills 40 inches apart, and 15 inches in the row, using 12 lbs. of seed per acre. A month later it was harrowed, and cultivated three times during growth, and, owing to the wet season, hand-hoed twice. The crop ripened in the middle of April. The area devoted to this experiment was 45 acres, so that fair practical returns were assured. The results are very instructive, as shewn below:—

	1913-14.	1914-15.	
Plot.	Crop.	Crop.	Yield in Lbs. per Acre.
1	Maize	Maize (Hickory King)	1,350
2	German millet	do.	1,416
3.	Kaffir corn	do.	1,428
4	Linseed	do.	1,586
5	Maize & velvet beans	do.	1,845
6	Ground nuts	do.	1,964
7	Oats	do.	2,150
8	Potatoes (manured)	do.	2,580

Taking first into consideration the effects of the preceding crops on the maize yield, we find it clearly shewn that maize after maize yielded the worst return, only about one-half that of the best. This is a striking demonstration of the unwisdom of continuous cropping, and speaks for itself in condemnation of what is unfortunately still the general practice in the country.

Crops of similar description, kaffir corn and German millet, rank next, and practically equal, but are clearly not to be recommended immediately to precede maize in the rotation. Linseed, too, exerted an effect, which points to its being placed elsewhere in the rotation, and to the need of manuring the ground after growing so exhausting a crop. This plot shewed a poor colour during the first two months of growth, markedly distinct from all the rest, and it was quite apparent that the maize yield would suffer.

A mixed crop of maize and velvet beans used for silage gave much better results. The improvement of the soil by virtue of the leguminous crop, even mixed with mealies, in organic matter, in nitrogen, and in mechanical condition, more than made up for the presence of maize in both years in succession. The yield was almost 500 lbs. per acre better than where maize alone was grown in 1913-14.

Ground-nuts, though an oil crop, and so making a considerable demand on the soil, are also leguminous, and entail in their culture thorough tillage of the soil, the combined advantage of which leads to a very beneficial effect on the following maize crop, so that Plot 6 exceeds Plot 1 by just three bags per acre.

That maize after oats gave even a better result than after a fallow crop like ground-nuts is somewhat remarkable, but is borne out by the results obtained in past years, both at the Gwebi and Salisbury Experiment Stations.

Finally, the best yield of maize was obtained, as might be expected, after the only crop which had been manured, the potatoes having had dressings of dung and artificials in various quantities in a series of manurial experiments, and to this the result must in large measure be attributed.

Crops.—Maize will no doubt long continue in the premier position among the crops of Rhodesia. It is, however, generally recognised, and the experience of this year has brought it home to many more urgently than before, that the first necessity of arable farming in this country is additional crops supplementary to our chief staple. That this is essential is so universally admitted that there is no need to labour the point.

Many different crops, foreign and native, and very many varieties of each, have been tried at the Experiment Stations in different parts of the country during past seasons, and with a varying measure of success. Some have passed into general use amongst the farmers of the country, others are in process of being popularised, whilst a few are still in the initial and probationary stage, for several seasons' experience is necessary before a new introduction is to be depended upon.

The results obtained with crops at the Gwebi Experiment Farm during the season 1914-15 will therefore no doubt be found instructive and helpful to the many farmers interested in the problem of extending the scope of their operations, by growing a larger variety of farm produce.

Maize.—As indicating the measure of fertility of the farm expressed in terms of maize, and therefore familiar to everyone, the following figures may be given. The actual area under maize at the Gwebi Farm was 185 acres. Of Salisbury White, without fertiliser, the average return per acre was 12¼ bags; with the normal dressing of artificials, this was raised to 16½; whilst the best plots yielded nearly 18 bags per acre. Hickory King (10-row) gave 7 bags per acre without fertiliser; 9½ bags with fertiliser on the average, and 12¼ bags as a maximum. Hickory King (8-row) on our poorer or worn-out lands gave, unmanured, an average of 8½ bags per acre, and at the best 13 bags. Altogether 1,787 bags of maize were grown on the farm. From these figures farmers will be able approximately to measure the fertility of the land and to contrast it with their own.

The maize on this farm has for years past been very scrupulously selected, and always the best sown of each crop. About 10 per cent. is selected as pedigree seed, from which farmers throughout the country can establish strains of the best seed for further use. The quantity available this year out of the above crop for distribution has amounted to 200 bags, which is now being issued from the Department of Agriculture.

Kaffir Corn.—That there is a good local and oversea market for kaffir corn is well known, and the crop is indigenous to the country. There is, however, always room for improvement, and, therefore, experiments were conducted with four improved American varieties on sixteen acres of land. These crops were sown in the end of November at the rate of 5 lbs. per acre, in drills 3 feet wide. All grew well, White Sapling being the most vigorous, but Texas Red and Feterita proved much more early maturing, coming into flower in the middle of February, and ripening in the middle of April, whilst White Milo was somewhat later, and White Sapling the latest, but also the tallest and strongest of the four.

These improved varieties of our native crop under methods of European cultivation shew that kaffir corn is undoubtedly a suitable and desirable crop, and would have proved remunerative but for the havoc caused by small birds. Owing to this plague, the crops were so diminished that the yields are no indication of the success of the new varieties. The past season was, however, exceptional, and reports have been received of the destruction of kaffir-corn crops in many parts of Rhodesia from the same cause.

Oats.—Unfortunately the conditions during the past season were adverse to securing good crops of either wheat or oats. The latter crop was sown in new land, which could not be ploughed until December, and the very heavy rains which fell immediately before and after a late seeding caused the ground to cake, and prevented proper harrowing and rolling, which are essential for a crop of this kind. In a normal year, however, a yield of from 1 to 1½ tons of oat hay may be expected, and a few acres of oats will always well repay those farmers who have stock to feed during the winter months.

A severe test was given to the four varieties of oats which have in past years proved themselves the most promising of the many sorts tried, viz., Kherson, Smyrna, Burt and New Zealand. These were sown on new land without manure of any kind, but twice ploughed and well prepared. The season was very much against them, and the yields were consequently very light and no fair criterion.

It has been conclusively proved that early maturing varieties of oats are those which do best, and that Kherson, a so-called sixty-day oat, has, so far as tested at the Gwebi Experiment Station, best withstood the ravages of rust.

Wheat.—During the past few years variety trials of wheat have been carried out at the different experiment stations, and of those tested at the Botanical Experiment Station, Salisbury, the most resistant to rust were Bishop, Victoria, Nlargius and Yellow Cross, of the named varieties, and five hybrids. All these varieties were tried at the Gwebi Farm during the past season on a larger scale than hitherto. The total area was 44 acres, and of this 22½ acres were sown to Yellow Cross, which had proved a heavier yielder than any of the others during the season 1913-14.

Unfortunately the weather conditions proved favourable to rust, and, although fairly good stands resulted, in all cases the plants suffered so severely in the piping stage that the seed failed to form in the ears.

Of the 44 acres sown, only 14 acres of Yellow Cross and 3 acres of hybrids were cut for grain. The rest was mown for hay when there seemed no hope of a return of seed. The yield of seed per acre from the Yellow Cross variety was only 270 lbs., whilst the three hybrids yielded about half of this amount per acre.

It was noticeable that the plants on new land remained more robust and more resistant to rust than those on the land which had carried maize the two previous seasons, and it is possible that a top dressing of fertiliser applied in the early stages of growth might have had a beneficial effect, and carried the crop through in spite of the rust.

Dhal.—Dhal has evidently come to stay, and gives promise of becoming one of our best and most popular crops.

The first trial of this crop at Gwebi was only made two seasons ago. This plot has now come through its second year. It is three acres in extent, and was sown in drills 3 feet wide with seed 1 foot apart. It gave in the first season a return of 466 lbs. and the second year 700 lbs. of clean pigeon peas per acre. The only attention it received was one cultivation and harvesting. This return was obtained without manure. It came into full flower in the middle of April, but suffered from the frosts of June, which cut it down before all the pods had ripened. Insect pests were also in evidence, and reduced the returns. A further area of 13 acres was planted last season on a worn-out piece of land, mainly with a view of ascertaining how far this leguminous crop might be of use in restoring fertility. Seed was sown at the end of November at the rate of 4 lbs. per acre, and a good crop resulted, in spite of weeds. Three times the crop was cultivated. Different distances of planting were tried, and it was found that drills 40 inches apart and plants 8 inches apart in the rows were best. The crop was somewhat late, and was severely cut down by frost before it matured fully.

It should be remembered that one of the merits of this crop is its use as a fodder crop for pigs, as well as grain for human and animal consumption.

Velvet Beans.—This valuable fodder crop has now come to be recognised as quite one of our best soil improvers, as well as being remunerative in itself, and a valuable acquisition to our winter feeds for stock. This year it forms one of the principal parts of the diet of the stall-fed oxen in the feeding experiments. The cultivation of velvet beans is simple, but may be briefly recapitulated for general information. The land used had previously borne a maize crop, after the removal of which it was ploughed, rolled and disc-harrowed, and then, shortly before sowing, it was drag-harrowed. No fertiliser was used, and 25 acres were planted by means of a mealie-planter, the seed 2 feet apart and 13 lbs. per acre being used. It was found later that thicker sowing, say double as much seed, would have had better results. It was cultivated twice and hand-hoed once. Part was cut green for silage, and part made into hay, of which about one ton per acre was procured. June frost did some mischief, but not enough to prevent the crop being regarded as a successful and remunerative one, which will always form one of the regular rotations of the farm.

Cow-Peas.—Mainly with a view to restoring to good heart a piece of land which had been long under exhaustive cultivation, but also to give a fair trial to this crop, which is not as yet very largely sown, 25 acres were put down to two varieties of cow-peas, New Era and Natal Black. Only the earliest ripening seed was gathered, the bulk of the crop being ploughed under for green manure. New Era cow-pea proved the earlier variety of the two, maturing in three-and-a-half months, and the lighter yielder, although, as indicated above, the crop was not harvested for seed. Natal Black was fully a fortnight later, but gave a much heavier crop.

Cow-peas may confidently be recommended, apart from the seed, as a useful fodder crop when made into hay and baled, as well as for ploughing in as a green manure, the course adopted in the above case.

Ground-Nuts.—Although the red soil of the Gwebi Farm is not regarded as ideal for ground-nuts, yet it has been demonstrated that good crops can be grown, and that the crop is desirable both on account of direct profit and as a useful rotation crop. A ready market for the pea-nuts is obtainable both on the mines and at the new oil factory in Salisbury, or they may be employed as a part of the feed of milk or fattening cattle.

Last year's experience with two varieties grown side by side for comparison may be given. On well prepared land the shelled seed was sown in drills 3 feet wide and 18 inches in the row by hand on the 27th of November, after which the land was harrowed, cultivated twice during growth, and finally earthed up with a shovel plough. The Spanish variety looked better all along than the Virginia Bunch, and was harvested exactly six months after sowing, in the end of May, the Virginia Bunch ripening a fortnight later, and yielding the heavier crop. The average yields per acre were for Spanish 1,390 lbs., and for Virginia Bunch 1,540 lbs.

Teff Grass.—This crop is now quite recognised and generally adopted, being valued both for the excellent quality of the hay and its utility as a rotation crop, especially for cleaning land foul with weeds, by its own rapid and dense growth. Old maize land was chosen, and, after good preparation, sown at the rate of 7 lbs. of seed per acre, broadcast, on the 15th of January. The first cutting was made on the 23rd of March, a second on the 15th of May: the first crop was 1,125 lbs. per acre and the second 800 lbs. A piece allowed to ripen yielded 450 lbs. per acre of seed, whilst the threshed hay-straw was utilised on the farm, although it could not be reckoned as saleable hay.

Mangel Wurzel.—This most useful crop hardly receives the attention which its success deserves, and which is warranted by its great value as a nutritious, succulent feed for stock in winter. It grows well, yields well, and keeps well, and is far superior to majordas and so forth in feeding qualities. Mangels require good treatment, and repay it.

The land intended for this crop was occupied the previous season by cow-peas, and after harvest it was ploughed and disced, and in spring eight tons per acre of kraal manure was applied, and the ground re-ploughed and twice drag-harrowed. Double complete Safco at the rate of 100 lbs. per acre was applied with the seed, and, at time of thinning, 25 lbs. of nitrate of soda was broadcasted as a top dressing. Seed at the rate of 5 lbs. per acre was sown in drills 2 feet 6 inches apart.

The mangels were kept well hoed. As a result of this good treatment, good crops resulted, the yields per acre being respectively for Sutton's Half Sugar mangel 25,750 lbs. (12⅞ tons), and for Yellow Globe Prizewinner mangels 17,900 lbs. (9 tons). Very useful in Rhodesia, although below English returns for the same class of crops.

Majordas.—By comparison with the above, a crop of native majordas, manured with six tons of kraal manure, but without the artificial fertiliser, gave 13,400 (6¾ tons) per acre, and unmanured 5,186 (4⅛ tons) per acre. These gourds, useful as they are, possess, of course, a much lower feeding value than mangels.

Linseed.—Three varieties were tried, the White Flowering, the Yellow Seeded and Large Seeded kinds. The first did best throughout, and all three seemed good crops, but proved disappointing when threshed out, having suffered much during harvest from rain and also from the ravages of a seed-devouring beetle. These accidental circumstances materially diminished what otherwise might have been a profitable crop.

The respective yields per acre were:—

White Flowering linseed, 210 lbs.
Large Seeded linseed, 175 lbs.
Yellow Seeded linseed, 150 lbs.

Sunflower.—This is an oil crop and stock feed, particularly a poultry food, and is gaining in favour. Two acres of each of two varieties were sown and did fairly well.

The striped Russian sunflower is the taller growing of the two, and fully three weeks earlier than the Black Seeded variety, and also yielded the heavier return last season, although under other weather conditions this might have been reversed. The first-named gave 710 lbs., the other 610 lbs. of seed per acre.

Castor Oil.—The possibilities of this crop are often discussed. So far, it cannot be said to have established its right to recognition. It may do in our warmer regions and on rich soil, but in such places other and more certain crops are likely to be tried. A couple of acres have, however, been sown, and gave the first year a return of only 60 lbs. per acre, although the growth was good and promising for next year. This experiment will be continued.

Failures.—Amongst experimental crops which can only be registered as entire failures, we have to record common hemp and Anjou hemp owing to flooding; barley varieties owing to rust; millet, both Japanese and German varieties, owing to unfavourable weather conditions; whilst the kaffir corns, although good stands, were virtually destroyed by the bird invasion. Certain of these crops will be given further opportunity of shewing whether they are to be considered as worth growing, in spite of the misfortunes of last year.

The experiments at the Gwebi Farm were carried out under peculiar difficulty and disadvantage last season, owing to the shortage of the departmental staff on account of the war. In these circumstances special recognition is due to the manager, Mr. J. H. Hampton, for carrying on the work of the experiment farm without the aid and support usually available.

A considerably extended series of experiments has been devised for next year as the outcome of lessons now learnt, particularly in connection with the use of fertilisers and the adoption of systematic rotation of crops.

Visitors to the farm, which lies on the Sinoia railway line, twenty miles from Salisbury, will always be welcome, for much information can be conveyed by actual visual and oral demonstration, which can hardly be supplied in cold print.

Gwebi Experiment Farm.

RETURNS SHEWING APPROXIMATE COST OF EACH OPERATION ON THE FARM.

The figures given below have been worked out from carefully kept accounts, and we publish them in the belief that they will be of interest to farmers for purposes of comparison :—

Operation.	Cost per Acre.		
Disc ploughing (new land)	£0	2	3
Disc ploughing (old land)	0	2	0
Mouldboard ploughing (new land), 3 furrow	0	2	9
Mouldboard ploughing (old land), 3 furrow	0	2	6
Mouldboard ploughing followed by subsoiler	0	5	0
Disc harrowing	0	1	0
Drag harrowing	0	0	9
Harrowing with Hallick weeder	0	1	0
Broadcasting fertiliser (Maybole distributor)	0	1	0
Carting and spreading kraal manure (8 tons per acre at 1 mile from homestead) ...	0	16	0
Rolling	0	0	9
Planting maize (mules)	0	0	9
Planting wheat, oats, linseed, etc., with drill	0	0	10
Broadcasting teff, etc., by hand	0	0	6
Hand hoeing maize, mangels, sunflower, etc.	0	4	0
Horse hoeing maize, mangels, sunflower, etc.	0	0	9
Harvesting maize, sunflower and similar crops and preparing for market	0	12	6
Harvesting monkey nuts and preparing for market	1	2	6

	Cost per Acre.		
Harvesting oats, wheat, linseed, etc., for seed	£1	0	0
Harvesting cowpeas and beans	0	15	0
Cultivating with wing shovel	0	1	0
Harvesting dhal and preparing for market	0	12	6
Harvesting castor oil beans and preparing for market	1	0	0
Harvesting velvet beans for hay	0	12	0
Harvesting velvet beans for seed	1	0	0
Harvesting oats, teff, Boer manna and hay crops and preparing for market	0	10	0

One ox costs 1¼d. per day.
One mule costs 4½d. per day.
One driver costs 1s. 6d. to 1s. 9d. per day.
One labourer costs 6d. to 1s. per day.

Cut your Pigs Young.

"The fact that hogs may be castrated at any age with little risk is the reason offered by many farmers for not performing the operation when the pigs are suckling. However, the loss due to putting off the operation too long is greater than is commonly supposed. The older the animal, the more difficult it is to handle, and the greater the loss of blood and vitality. When the operation is deferred until weaning time or later, the pigs lie around in a stiffened condition, lose their appetite, shrink in live weight, and it often takes two weeks before they are all back again in normal condition and ready to make profitable gains. On the other hand, the pig that is castrated when from four to six weeks old loses but little blood, and continues to nurse, scarcely noticing the operation."—*Bulletin on Pork Production ex University of Wisconsin.*

Rhodesia as a Cattle Country.

By Richard Walsh.

Having had practically three years' experience in Rhodesia, and seeing it during the period of the worst drought and also during the heaviest rainy season known, I now feel qualified to express an opinion of it as a cattle country, as a great portion of Rhodesia—and the rainfall, especially in Matabeleland—is so similar to Texas, where I spent twenty-six years cattle ranching.

I consider the grasses of Rhodesia to be very good, and to possess fattening properties superior to any ranching country that I know. I may mention that my experience has extended over the various States of North America, Mexico and Brazil. I have never been to Australia, and therefore cannot make a comparison between that country and this. There are parts of the country, especially in Mashonaland, where the grass is too coarse and strong to be good grazing; such land as that, I presume, will eventually become farming and mealie-growing lands. I do not know of any ranching country where cattle carry such good condition as they do in Rhodesia, especially during the winter months.

I have often been asked how our seasons in Texas compared with those here. In the northern part of Texas we had practically five dry and cold months—with the exception of a couple of falls of snow—but we had no clearly defined wet season such as there is here. Our rainfall was practically the same as that over the greater part of Matabeleland, namely, 23 or 24 inches, and it was fairly evenly distributed over the seven months, although I have known 6 inches of rain to fall in a few hours, but that was quite exceptional.

The changes of climate in Texas are much greater than here. In the summer the thermometer registered from 90 to 110 degrees in the shade, but we always had cool nights similar to Rhodesia; while once or twice in the winter time the thermometer would register as low as 10 degrees below zero. This extreme cold in the winter was the cause of death loss in cattle. I find a great many people in Rhodesia speak of very heavy death losses, but the losses are nothing in comparison with those in Texas. There, I should say the average loss was 10 per cent. I have known it to run as high as 20 per cent. Last year (in Rhodesia), which was particularly bad, owing to the drought being followed by excessive rains, we lost 8 per cent., the greater portion of which were newly born calves. This year I shall be very much surprised if our losses reach 3 per cent.

While the running rivers in Rhodesia are rather far apart, my experience has been that water can be obtained at a shallow depth by digging wells or drilling boreholes. On the B.S.A. Company's Rhodesdale Ranch we have about 28 wells and two boreholes, which are drilled to a depth of 150 feet, and furnish an inexhaustible supply. The wells are dug, and vary in depth from 8 feet to 20 feet. We only had one well fail during the extreme drought last year, but we dug another well within 100 yards of it, and got a good supply of water. From what I have seen, I consider that a sufficient supply of water for stock purposes can be secured at a comparatively small cost.

Although the native cattle are small, I consider them to be quite a good type, and particularly adapted to produce a very much superior animal when crossed with bulls of any breed other than the native. They are good mothers, and particularly quiet and gentle, which speaks volumes for the way the native boys treat them. Not that I advocate the present system of herding and kraaling, which I consider very bad for the cattle, and, as pointed out by Mr. Hull in his recent article, "Grading of Cattle in Rhodesia," well-bred cattle could not exist under the kraaling conditions. At present one is compelled to herd and kraal, in order to protect the cattle from the depredation of wild animals.

We had cattle running all last year in paddocks, and it was very noticeable how much better they did than those that were kraaled. A few months ago wild dogs visited the paddocks, and, besides killing some of the cattle, they ran and scattered the others, and made them so nervous that they were doing no good, so we had to resort to the kraaling again. We succeeded in getting a number of the dogs by shooting and poisoning, finding their dens and destroying the pups. This latter way I think the best to get rid of them, and I feel sure, if all landowners would offer a small reward to natives for finding these breeding dens and destroying the pups, that in a very few years there would be a marked decrease in the number of wild dogs. Also, if farmers and ranchers made a practice of poisoning carcases of animals that die and game they kill, it would soon get rid of pests, so that stock could be run in paddocks instead of kraaling.

The native cattle are very much in-bred, and consequently respond at once to an out-cross with bulls of other breeds; a striking example were the oxen bred by Mr. T. McKinley, of Glenmore farm, Seringa, sold on the Bulawayo sale the other day for £18 17s. 6d., and estimated to weigh 800 lbs. Mr. McKinley told me these oxen were bred from Angoni or Barotsi cows bought north of the Zambesi River, by a grade bull. Of course these cattle had been stall fed.

I am continually being asked what is the right breed of cattle for Rhodesia. My answer is that no particular breed is the only one especially adapted to Rhodesia. It will be found here, as in other countries, that in certain parts cattle of one breed will do well, while cattle of other breeds will not do so well in that particular district. The same thing pertains in all countries; even in England, which is the greatest cattle breeding country in the world, you will find that in certain parts the Shorthorn predominates and does especially well, while in other parts you will find the Herefords, in other the Sussex and the Devon, and so on—the Aberdeen Angus in Scotland. So it is in Rhodesia; no particular breed will be suitable for the country as a whole. This will regulate itself as people find out what particular breed is best adapted to their locality. All breeds are good, and will be a great improvement on the native stock.

In my opinion, the great mistake which farmers and ranchmen make in this country is that they are too fond of changing their breeds. What they want is to make up their minds what breed they will go in for, and then stick to that breed. Don't give it up after two or three crosses, and change off to some other breed. I am often told by men that they have been using, say, Shorthorns for two crosses, and that now they thought to use bulls of some other breed. This is altogether wrong. They will never have uniformly good cattle if they keep skipping and changing from one breed to another. When a man makes up his mind as to what breed of cattle is best adapted to his veld, he should stick to that breed for the rest of his life. The herds that have made England so famous have been handed down for generations from father to son, and the sons have carried on their father's line of breeding, thereby attaining the great results they have. Great results can be obtained by continuity of breeding, while nothing can be obtained by changing from one breed to another.

I have got the reputation of being a Hereford enthusiast, but this is only because I made the success of my life breeding Herefords. This success was made because I first found the particular country where Herefords would do well. My father was a most enthusiastic Shorthorn man, and was quite horrified when I took up Herefords, although he afterwards acknowledged that I was right, but always reminded me that if one had the farm that would carry Shorthorns successfully, there was nothing to beat them.

I do not consider it necessary to use thoroughbred bulls of any breed for the first cross on the native cow. I think that a good grade bull or an Africander is quite good enough for the first cross. The great thing to attain from the first cross is the increase in size: after that is acquired, it is most desirable to use thoroughbred bulls. This is not in accordance with Mr. Sinclair's statement about Texans having no time for anything but a thoroughbred bull. He is quite right, but then they have arrived at the stage in Texas where they must use thoroughbreds if they hope to improve their cattle. All the best ranch herds in Texas were bred up by the use of grade bulls first. I flatter myself that I bred and sold more high grade bulls than any man in Texas. I sold bulls to nearly every ranch in Texas. To one large ranch I sold 600 yearling bulls at one time, and for a number of years after I sold them

300 a year. This is now one of the best herds in Texas. Of course, for some years past they have used nothing but thoroughbred bulls. It has been demonstrated there that grade bulls are quite good enough for the first cross. Texas cattle were of very poor class before the grading-up commenced. I hope no one will think that I disapprove of the importation of thoroughbred bulls; on the contrary, my heart rejoices every time I see one enter the country.

One of the most serious drawbacks to ranching in Rhodesia is veld fires, and something must be done to control this burning of the veld if this is to be a cattle country. The Native Commissioners can stop it as far as the natives are concerned, but a great many fires are started by white men prospecting and hunting. These fires cause sufficient loss and inconvenience now when the country is sparsely stocked with cattle, but when it is fully stocked, veld fires such as we have had this year would mean absolute ruin to stock-owners.

One of the most important wants of Rhodesia is markets for her cattle, both oxen and old cows, and there must be a market opened up for them in the near future. In fact, there is not a day to be lost in doing so, as we all have a number of old cows that should be got rid of, but until a canning factory is established, I do not see much chance of working off these old cows, and it is poor economy to keep them until they die. I hope to see a canning factory established before long.

I will conclude by saying that I have every confidence in Rhodesia as a cattle country, and I feel sure that some day she will take her place as a great beef-producing country. Pessimists will say, "But what about diseases?" My reply is, that I do not consider that she has more diseases than any other new countries have had. I think that under the very efficient Veterinary Staff she has, and the stringent restrictions in regard to the movement of cattle, there is little fear of the spread of disease. Even should it occasionally occur, it can be promptly stamped out.

Ticks and the Animal Diseases.

A Lecture delivered by Ll. E. W. Bevan, M.R.C.V.S., Government Veterinary Bacteriologist, before the Lomagundi Farmers' Association, Sinoia.

Mr. Chairman and Gentlemen,

In the first place, I must thank you for your kind invitation to be present here to-day to address you on the somewhat comprehensive subject selected by you, namely, "Ticks and the Animal Diseases."

I must confess that it was with some misgiving that I accepted this invitation, because I have had very little experience in public speaking; in fact, I have only once before attempted it in this country, and that was, as might be expected, shortly after my arrival, because it is generally the person who has just stepped off the last train who is most ready to air his opinions and "lay down the law" on local problems.

I have not made the attempt since, because my first essay was not an unqualified success. I endeavoured to impress upon my audience the importance of scientific research in connection with the animal diseases in this country, but I was overwhelmed by a somewhat vigorous criticism from one of the audience, who condemned science in terms rather more forceful than polite, and reminded me "that an ounce of practice was worth more than a pound of theory." Although I emerged from that ordeal somewhat chastened and depressed, I am nevertheless as fully convinced to-day as I was in the days of my youthful enthusiasm of the inter-dependence of science and practice in dealing with veterinary matters in this country.

They are to each other as the two blades of a pair of scissors. The scientist, if he is wise, to a large extent bases his research upon the experience and observation of the practical man, and the practical man in turn makes use of the findings of the scientific man in the daily practice of his profession.

There are some laymen, I fear, somewhat suspicious of the so-called scientific man, and believe that he is in the habit of disguising his ignorance by long-sounding words and obscure and unpractical theories. I propose, therefore, to-day to avoid scientific terms as far as possible, and to address you in terms of pounds, shillings and pence, which should, I believe, be intelligible to all of you, and I hope that before I have finished I shall succeed in convincing you that the tick is robbing you all of good money which should be in your pockets.

It may surprise you to hear that ticks are not insects, but are closely related to spiders and scorpions, and differ from insects by having the thorax and abdomen fused together, and in possessing in their adult stage four pairs of legs. However, I do not think it will serve any good purpose to worry you with a minute description of the structure and anatomy of the tick; but it is of considerable importance to discuss the development and life history of some of the chief species of ticks which, like the poor, are always with us in this country, because the measures of dealing with and eradicating them, and the diseases transmitted by them, are based upon these facts.

The general conception of a tick is based upon the form most easily seen attached to our domestic animals, namely, a large blue or brownish creature about the size of a pea or bean. These are the adult female ticks, and have undergone many vicissitudes before arriving at that state and size. Compared with them, the male tick is quite insignificant, not much bigger than a pin's head, and generally found beneath the female, closely attached to what is undoubtedly for him "his better half." As the result of his attentions, the female tick, up to that stage not much bigger than the male, gorges herself with blood, becomes enormously distended, and when replete falls to the ground. Here, having found some sheltered place, she burrows down into the loose soil and deposits her eggs—not a modest one or two eggs, but several thousands. One variety, the "striped-legged tick," has been known to lay as many as 13,000 eggs—would that we could discover a breed of chickens equally prolific!

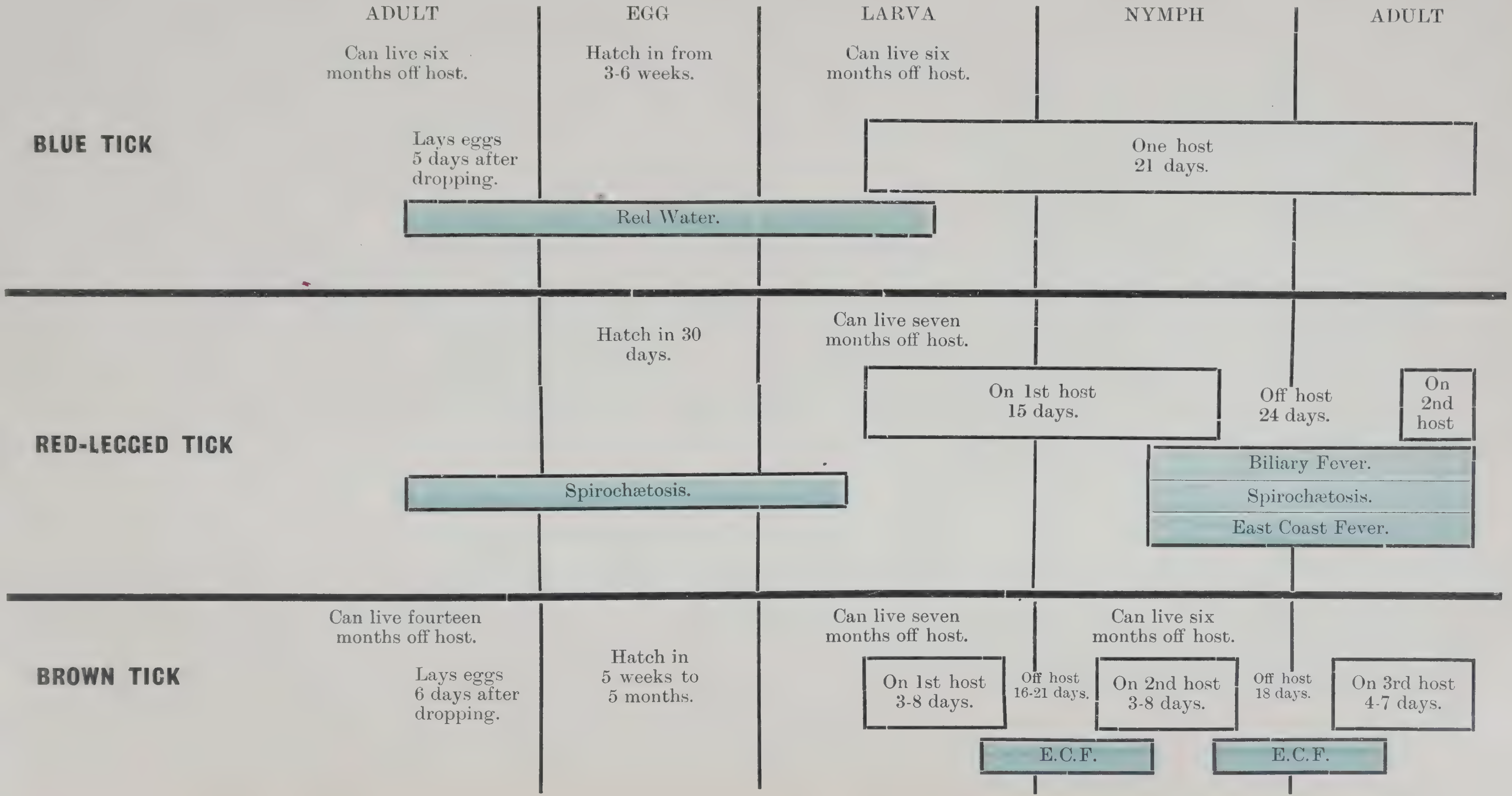
Now, each of these eggs, under suitable conditions gives rise after a varying interval to a young larval or "seed" tick, a vigorous little creature not much bigger than a pin's point, and only provided with three pairs of legs, that is, six, as against his parents' eight. Nevertheless, in spite of this deficiency, it can get about very actively, and rapidly crawls up a blade of grass, and perches itself at the tip. Here, balanced on its two hind legs, it stretches out its anterior pair, with which, when the opportunity occurs, it clings on to a passing animal, from which it derives nourishment in the form of blood. Having fed, it undergoes a resting period, and finally sheds its skin. It emerges as a *nymph*, in which stage it possesses four pairs of legs, but no sexual organs. The nymph again feeds, rests, and, having moulted, the *adult* appears. It is only in the adult stages that there is a differentiation of the sexes. Thus we see there are four stages in the life cycle of the tick :—

1. The Eggs.
2. The Larvæ.
3. The Nymphæ.
4. The Adults.

This has a most important practical bearing upon our subject. Some ticks spend the larval, nymphal and adult stages on the same host, and these are known as *continuous feeders*. Others, known as *interrupted feeders*, spend the larval and nymphal stage on one animal, drop off, moult or complete their development as adults on a second animal. Others again spend each stage on a separate host. The common blue tick is an example of the "continuous feeders." The red-legged tick is an example of an "interrupted feeder," which spends the larval and nymphal stages on one host and the adult stage on another. The brown tick is an example of one which spends each separate stage on a different host. These are our most important disease-transmitting ticks, and the measures of dealing with them are based upon the knowledge of their methods of feeding.

There are, of course, innumerable species of ticks in this country, but it would be impossible in the time at my disposal to deal with them; and I propose, therefore, to discuss only those which I have just enumerated as the principal offenders in the matter of transmission of animal diseases. The most important features to which I have referred in connection

Diagram shewing the stages in the life cycle of the Blue, Brown and Red-legged Ticks.
The plain sections indicate the hosts to which they attach, and the shaded sections represent the diseases transmitted in the different stages of the tick.



with these ticks are tabulated on Chart No. 1, which will be referred to in detail as we proceed.

Let us now discuss the manner in which ticks produce their harmful effects. In the first place ticks, like enemy subjects, are harmful by reason of the annoyance and irritation caused by their presence. Those of us who have had the misfortune at any time to sit upon a nest of enterprising young larval ticks will sympathise with the dumb animals, which have to submit day by day to a constant invasion by a countless army of ticks, big and little; for it is not only the ticks which we can see, the fully engorged females, which are to blame, but the innumerable larval and nymphal ticks, that do not attract our attention, which are the chief causes of unrest. When we remember that peace and comfort are essential to the fattening of stock, and that it is the primary object of every stock-man to fatten his stock in the shortest possible time, we realise that ticks are not only the enemies of our animals, but are indeed our own enemies, by indirectly robbing us of good cash which might be in our pockets. This reason alone justifies us in declaring war upon the tick.

But not content with constantly worrying our stock, they give rise to wounds and abscesses of a most unhealthy character, causing considerable pain, loss of condition and sometimes ending fatally. The foot-rot of sheep in this country generally originates from a wound caused by the "striped-legged tick," which attaches to the soft tissues above and between the clefts of the hoofs. The result of the injury to the sheep is often serious, and reduces the value of the animal. Occasionally a diseased condition of the tissues above the hoofs of donkeys occurs as an outbreak in different parts of the country, and that is also associated with the bite of the "striped-legged tick."

Again, it is no uncommon thing to find cows in this country with "blind" teats or diseased udders—the result of tick bites; and unfortunately it frequently happens that the better the cow, and the more generous her yield of milk, the more severely she suffers. In fact, a dairyman should make up his mind whether he is going in for milk or ticks, for he cannot have both; the most enthusiastic dipping men here and elsewhere are the milkmen, not so much perhaps out of consideration for their cattle as for the state of their balance at the bank.

The third manner in which ticks are harmful to stock is by the actual removal of blood. The amount of blood taken up by the blue tick varies from three to five grains, but the striped-legged and red-legged ticks take up twice or three times as much. Roughly, some two thousand to three thousand ticks would take up nearly a pint of blood. This would not be a very serious matter if it occurred only occasionally; for example, in the process of collecting blood for anti-rinderpest serum, cattle are bled to the extent of four litres, four or six times at intervals of a week, that is, from twenty-eight to forty pints are taken away without serious harm. But that is a very different thing from the constant depletion of blood day by day for months, and in many cases years, without cessation. The good blood which should be contributing to the growth of the beast is contributing to the growth of the ticks instead. Therefore, again, it is obvious that one cannot grow both beef and ticks.

Another remarkable feature which you have no doubt observed is that the poorer and more delicate the animal, the more attractive it appears to be to ticks—a most unfortunate association between cause and effect.

But a still more important matter in which ticks are harmful is by introducing into the animals upon which they feed minute parasites, which pass certain phases of their existence in the tick, and complete their development in and at the expense of the hosts upon which they feed. These parasites produce their ill effects in several ways:—(1) By interference with the circulation of the blood; (2) by destruction of blood cells; (3) by robbing the host of nutritive material; (4) by the production of substances, toxic or poisonous to the host.

Perhaps the best way to discuss these parasites is under the heading of the most important diseases caused by them.

First of all let us take the *Plasmoses* of cattle, which includes the two diseases generally known as Redwater and Gall-sickness. Both these common ailments are due to minute animal parasites which are inoculated into cattle by the blue tick which has previously fed upon an infected animal, that is to say, on one which has the parasites in its red blood cells.

Now, in this country, nearly all bovine animals are infected, having become inoculated in their earliest days, from the time they were first bitten by the blue tick. If thus infected at an early age, they do not suffer as severely as when infected later in life, and become more or less immune, or rather tolerant, to the parasites, which, although always present in them, rarely produce any serious symptoms. A sort of balance is established between the parasite and the resistance of its host.

Thus blue ticks, in taking up blood from such animals, take up also the parasites which exist in their red blood cells, and the parasites make their way into the eggs of the female tick, and through those eggs into the larvæ or seed ticks, each one of which is able to transmit the parasite to the animal upon which it feeds.

This is a point of considerable practical importance which I wish to emphasise, namely, that all bovine animals born and bred on a "redwater veld," that is, veld upon which blue ticks are present, are inoculated with the Redwater and Gall-sickness parasites, which they retain in their blood, and supply to blue ticks feeding upon them. The parasites pass through the eggs of the tick to the larvæ hatching from them, which again pass them on to cattle upon which they feed.

The fact that these parasites are present in the blood of apparently healthy cattle is proved in this way. If a few drops of blood, taken from any bovine animal which has been on veld infested with blue ticks, are introduced by means of a syringe under the skin of imported cattle from Great Britain (where these diseases are not prevalent), the following events occur with considerable certainty and regularity. After an interval of a week the temperature of the inoculated beast begins to rise, and during the following days continues to do so, rising as high as 106 degs. F. to 107 degs. F. The animal shews all the indications of fever and malaise—a dry coat, running at the eyes, loss of appetite, cessation of rumination, constipation or diarrhœa, and often passes blood-stained urine, or shews intense jaundice. With soft, pampered, fat or inbred animals, especially if over eighteen months or two years of age, these symptoms may terminate fatally; although younger animals, or animals of sounder constitution, have a better chance of recovery. Since the discovery of trypan blue, which is a specific against this disease, the early recognition of the symptoms may enable one to apply treatment and bring about recovery.

If the blood of an animal suffering from the disease is examined under a microscope, it will be found to be made up of a number of round cells of a reddish yellow colour, and others of varying shapes floating in a fluid medium. These are the so-called red and white corpuscles. In the red cells of affected animals may be seen certain minute pear-shaped bodies, often in pairs, which are the causal parasites of Redwater and bring about the breaking-down, or solution, of the red cell. The red colouring matter of the cell passes into the urine and gives it the characteristic colour from which the disease "Redwater" obtains its name. In other cases the products of the broken-down cells become filtered off by the liver, which becomes supercharged with this material in the form of bile; this makes its way into the circulation, and the condition known as jaundice is set up. In either case the destruction of the red cells is considerable, and often three-fourths of the total number of them are destroyed in this manner.

If the animal recovers from this attack, there is an interval of a week, or perhaps two weeks, during which it appears to have completely recovered; but somewhere about the twenty-fifth to the thirtieth day its temperature once again commences to rise, and a second illness sets in, with symptoms very like the first, except that the red urine is seldom passed. The most pronounced symptoms are those of jaundice, and hence the common name "Gall-sickness" is used to describe this disease; but in other cases the red cells become broken down, and the only symptoms are those of intense anæmia. This may be explained by the microscopic examination of the blood, when it is seen that the red cells are again invaded by another foreign body, a small, deeply staining particle, most often situated at the margin of the cell. When stained with certain dyes, it resembles the nucleus of the Redwater parasite, but has no body substance. Theiler regards it as a parasite distinct from the Redwater parasite, and has called it "Anaplasm," that is, without plasma, and the disease is now called "Anaplasmosis" by veterinary people, although the layman, who recognises the bilious form of it by the name

"Gall-sickness," finds himself without any name to describe the anæmic form of the disease.

In one very important respect this disease differs from Redwater, namely, in the fact that it does not respond to trypan blue; indeed, no specific cure is yet known for it, and unfortunately far more deaths are due to it than to Redwater.

In imported stock thus inoculated, or infected naturally by ticks, we see these diseases in the acute forms; but even in animals born locally they are responsible for considerable losses, not only in deaths, but in other ways. I have described how young bovines in this country become infected from the first bite by the blue tick, and although they offer considerable resistance to the parasites, they do, nevertheless, suffer ill effects by the constant breaking down of their red blood cells. As you know, the blood is the fluid medium by means of which all the tissues of the body are directly or indirectly nourished; and it is obvious that if the constituents of the blood are being depleted, or its nutritive properties are being used by the parasites, the tissues of the body must suffer. As I have said before, the young animal requires blood, not only for maintenance, but also an excess for growth, and, if this excess is not forthcoming, it cannot develop and grow out as it should do. The smallness of our local stock may, to a very large extent, be attributed to this fact. There are, it is true, other contributing factors, as, for example, injudicious breeding, that is, in-breeding, or breeding from inferior parents; shortage of water and food in winter; and very often, unfortunately, injudicious management; but undoubtedly the anæmia due to tick disease plays the most important part.

In addition to the loss of growth, there is also the lowered vitality, so that the animal, continually subjected to the invasion of these parasites, becomes the ready victim of other minor ailments, such as scour, pneumonia and liver disease, which, if in a state of health, it would easily overcome.

The proof of this lies in the enormous improvement and better development of young stock which are regularly dipped. When I first came to this country the dairymen on Salisbury commonage used to lose nearly all their calves from various diseases, most of which were secondary to Redwater infection, and those calves which survived grew up into poor stunted specimens. That this was not entirely due to "putting the calf through the separator or into the bottle" is shewn by the remarkable improvement which has followed "systematic dipping"; although I do not suppose the calves get more food to-day than hitherto.

Let us then review the losses or approximate losses due to the Plasmoses of cattle.

First of all, there is the loss of imported stock. Our indigenous cattle are quite useful foundation stock, but are notably small and slow to mature, and great improvement is necessary before we can hope to find a market for them "outside the tin." New blood is absolutely necessary to give larger size and quicker maturity.

Those of you who attended the last Congress of the Agricultural Union will remember that the Chief Veterinary Surgeon told us that in Texas breeders used only thoroughbred bulls, and generally in the proportion of one bull to twenty cows. On that basis, if we are to compete with the other meat-producing countries, we are at least five thousand stud bulls short of our requirements; but under existing conditions, the importation of stock into this country from overseas is a proceeding fraught with such danger that farmers can rarely afford it.

Next, as I have said, there is a loss of young stock. Again, those of you who attended the Congress will remember the complaints of delegates from various districts, that they had lost anything from 25 per cent. to 75 per cent. of their calves. I hope that to-day I shall prove to you that this enormous waste can easily be prevented.

Then again, apart from the mortality, there is the loss of growth and early maturity. It is becoming abundantly clear that we can scarcely hope to secure an outside market for Rhodesian beef of the present grade. We find at our local shows animals which at three years old (and nearer four) dress at 600 lbs. securing the challenge cup, proving that these animals are of exceptional virtue in this country, although they would be scarcely up to the average weight elsewhere. It is rare for our local animals to weigh 400 lbs. at this age, and the heavier weights are only attained when they are reaching a "ripe old age," and their meat no longer possesses the qualities necessary for the open markets. If we estimate that the loss of growth, for the various reasons enumerated, is equal to ten shillings worth of meat per beast per annum, then Europeans in this country are losing over £170,000 a year, and if we include native stock, there is a dead loss to the country of nearly £400,000 per annum.

But this is not the only way in which ticks are costing us money. There is another tick-borne disease which, during the last fifteen years, has cost us directly and indirectly many hundreds of thousands of pounds. Directly, by the enormous losses of cattle; indirectly, by the interference with business and trade, the handicap to the various industries, and the loss of confidence in this country. The last should perhaps be quoted first, for it affects each one of you. If there were greater confidence in this country, the holdings of each one of you would become enhanced in value. And the pity of it is that the disease should be here at all, for it is one which could easily be eradicated; and it is one which the settlers themselves have it within their own power entirely to eradicate. The disease I refer to is African Coast Fever, which is essentially a disease of bovines. As far as we know, it does not and cannot exist in other species of animal. It is caused by a minute animal parasite which, like those previously referred to, passes part of its existence in the tick and part of it in the ox. While it is the blue tick which transmits Redwater, it is the brown tick (and occasionally the red-legged tick and the black tick) which transmits African Coast Fever.

It is the sexual form of the parasite which occurs in the tick and the asexual form which is inoculated by the tick into the ox. Once introduced into the ox, the parasite establishes itself in certain organs, such as the glands and spleen, and for several days produces no noticeable ill effects. This is known as the period of incubation, and the fact that the animal is infected cannot be detected by thermometer or any other means. But about the thifteenth day the temperature of the infected animal suddenly rises, and if a gland or the spleen is punctured, and material is drawn off and examined under the microscope, the parasite may be seen in clusters, forming what is known as the "Koch's body." For the next week or so the temperature remains high, and the parasites become more numerous, but it is not until about the twenty-first day that the animal appears really sick. About that time, when it would almost appear that the parasite begins to realise it has "gone too far," and may kill the generous host whose hospitality it has so abused, it makes its way from the clusters in the glands and spleen and invades the red blood cells. So numerous are the parasites that often as many as 75 per cent. of the red blood cells are invaded.

Now, apparently the parasites do not break down the cells, as in the case of the Redwater parasite, but they make use of the blood cells to transport them to the surface of the body, where they can be picked up again by brown ticks which may happen to be feeding on the ox at the time.

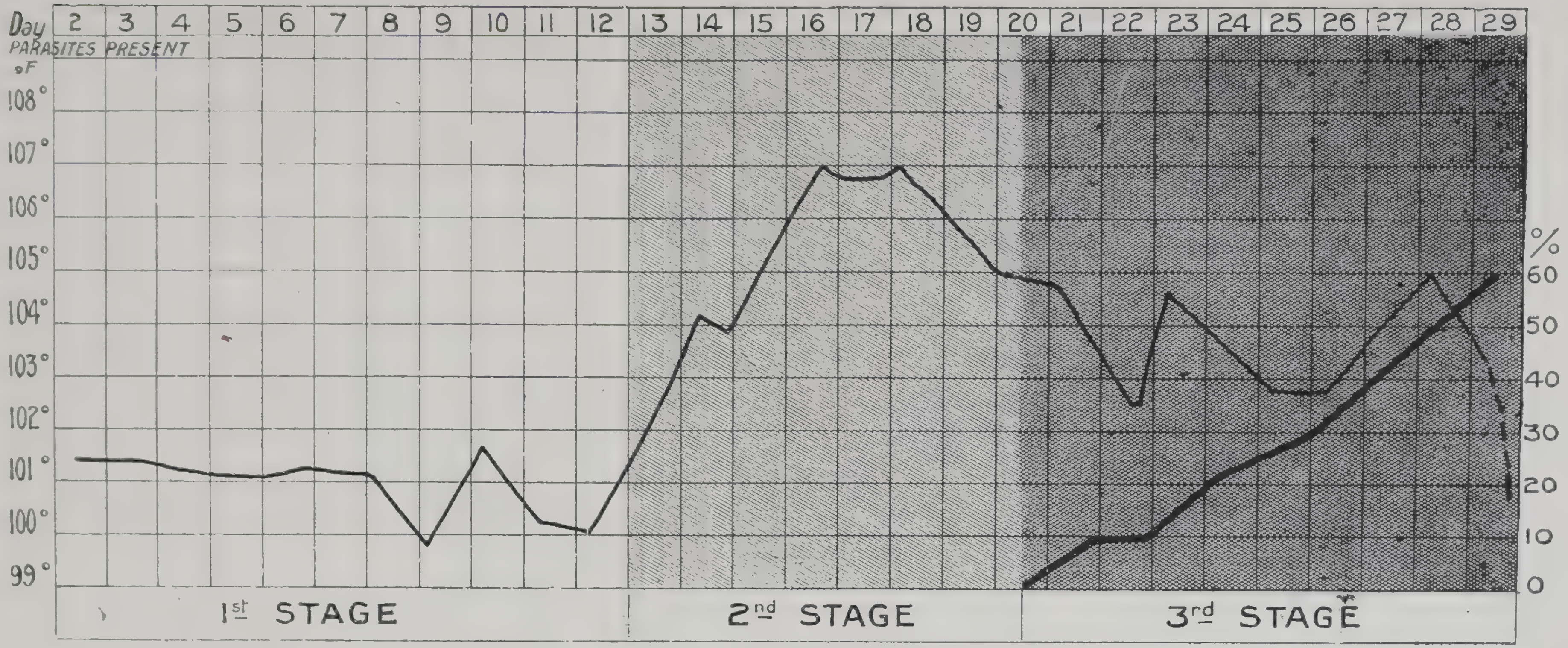
It would appear that the parasite of African Coast Fever produces its ill effects by the last method enumerated on my list, namely, by the generation of toxin or poison harmful to the host, because the symptoms of African Coast Fever are not very definite, and really come under the heading of a Toxæmia.

The sick animal may be dull, tucked up and will generally be found lagging behind the herd. It may stagger as it walks, and sometimes grunt or cough in a husky way. It will possibly be found to be running at the eyes and mouth, and to have a very high temperature.

On *post-mortem* the glands may be found congested and enlarged, the lungs may contain a quantity of straw-coloured fluid, which may whip up into a foam like that seen in cases of Horse-sickness. The abomasum or true stomach may be congested, and small punctate ulcers may be seen on its lining; the kidneys and liver may contain small spots on the surface, white or dark, varying in size from a pin's head to a pea, and when cut into, found to be wedge-shaped. These are perhaps the most constant and suspicious lesions of African Coast Fever, and are known as Infarcts.

The only certain way to diagnose African Coast Fever is by microscopic examination of the gland and blood. If the case is detected early, then a gland smear must be examined for Koch's bodies, and it is always well to send gland smears for examination, because by so doing the disease may be detected before the last stage, when the parasite makes its way into the blood and is in a condition to be taken up by the tick, and so, later, to be passed on to other cattle.

CHARACTERISTIC CHART OF AFRICAN COAST FEVER.



The Chart shews the body temperature of a cow infected in England by ticks sent from South Africa.
The thin black line indicates the temperature record.
The rise in the percentage of infected red blood cells is indicated by the heavy black line.

Stage 1.—The period of incubation.
Stage 2.—The period when the temperature is elevated, but parasites are not present in the blood. "Koch's bodies" may be found in the spleen and glands.
Stage 3.—The period when the parasites are present in the peripheral blood.

Now, I have said before that African Coast Fever is essentially a disease of bovines, and if the infected ticks bite any other species of animal, the parasite cannot establish itself in it, and dies out, and that tick becomes cleansed. African Coast Fever passes essentially from the sick ox through the tick to the susceptible ox, and that sequence is a *sine qua non.*

There is one saving factor in African Coast Fever in which it differs from Redwater. I have already told you that the parasites of the Plasmoses pass through the egg of the tick, but the parasite of African Coast Fever does not. With the death of the infected tick, the infection of that race of tick ceases.

What happens in African Coast Fever is this. The brown tick, as we know, is an "interrupted feeder." The larval tick feeds and drops off, moults, emerges as a nymph, and, having found a suitable host, feeds. Now, if the larva has fed on an infected ox having the African Coast Fever parasites in its blood, then the nymph will hand on the progeny of those parasites to the susceptible ox upon which it feeds.

Or to begin with the nymph. If the nymph has fed upon an infected animal, then the progeny of the parasites taken up are passed on by the adult tick.

The transmission of the parasite may be enormously postponed by reason of the length of time which may elapse between the feeding of the tick in one stage and the feeding again in the subsequent stage. Thus it has been found by experiments, and supported by practical observation, that the larval brown ticks, having fed, moult in about fourteen days, but may survive several months without feeding again as a nymph. And again, the nymph, having fed, will moult in about three weeks; but the unfed adult which emerges can survive even longer than the unfed nymph, and in one experiment was found alive after 600 days. However, in practice it has been found that if cattle are removed off infected veld they cannot be returned with safety to that veld for at least fifteen months, that is, until the race of infected ticks has died out; and it is highly probable that this time may in some instances be prolonged.

Now that we are studying the time table of the brown tick, there is another point of the greatest importance to mention, and that brings me to the part of my lecture which I have been hoping for, namely, the time when I can begin to justify my presence here to-day by indicating to you a means whereby you may find a happy issue from your afflictions.

The point I wish to emphasise is that the brown tick is an "interrupted feeder," that is to say, feeds on different hosts in different stages of its life cycle—on one as a larva, on another as a nymph, and on a third as an adult. The periods spent upon the different hosts vary, but frequently they may not exceed three days, that is to say, the tick may be on and off in seventy-two hours.

In this respect it varies from the blue tick, which is a "continuous feeder," that is, remains on the same host during the three stages—larval, nymphal and adult—spending upon the same animal as long as three weeks. When you see upon your cattle a fully inflated blue tick, it means that it is three weeks since that tick became attached as a larva.

It is upon the knowledge of these facts that the system of "short interval dipping," or "systematic dipping," has been worked out. The term "systematic dipping" implies the immersion of cattle, and other domestic animals, in certain solutions destructive to ticks and other parasites, at definite intervals, based upon a knowledge of the life cycle and habits of those parasites.

Although dipping has been practised in a desultory manner for a good many years, and its practical results have been known in a general sort of way to the farmer, the present system, based upon scientific data, is due to the researches by Lounsbury and Theiler, and especially to Watkins Pitchford, a scientist who, giving full value to practical observations, makes the best and most scientific use of them.

Now, just as the Yellow Fever campaign in Panama was directed against the Stegomyia, and the disease was eliminated by eradicating the mosquito which transmitted it, so these tick-borne diseases which cost each one of you so much, and constitute such a handicap to the progress of the country, can be "blotted out" by destroying the ticks; but, of course, "you've got to catch 'em first."

Since the blue tick attaches to an animal as a larva, and becomes a nymph and finally an adult on the animal, and takes as long as three weeks to complete the process, it is an easy matter to catch it and destroy it, by dipping in a suitable solution at fairly long intervals, say once a fortnight. As a matter of fact and experience, the blue tick is easily eradicated, and with it Redwater is eliminated. But the destruction of the brown tick is not such an easy matter, because, as we know, it may not remain on any one host longer than three days, and if the host is not dipped during that time the tick may escape. Supposing the host is an ox infected with African Coast Fever, then the larva may feed and drop off, and eventually infect a second ox to which it attaches later (perhaps many months after) as a nymph. Now, the problem resolved itself into discovering a dipping solution strong enough to kill the brown tick in any of its stages, but not so strong as to injure seriously cattle immersed in it at such frequent and short intervals as every three days.

Watkins Pitchford solved the riddle by elaborating the so-called Laboratory Dip. His first result was near it—the so-called "five-day dip"—but later he produced the final solution in the so-called "three-day dip." This was composed of—

Soft soap—3 lbs.
Paraffin—1 lb.
Arsenite of soda (80 per cent. arsenic)—4 lbs.
Water—400 gallons.

This preparation has been copied by several manufacturers, and the dip chiefly in use at the present time is "Cooper's (Homogeneous) Improved Dip," which, when one gallon is added to 300 gallons of water, forms a mixture of properties similar to those of Watkins Pitchford's "three-day dip."

Now, this dipping of cattle at such short intervals involves not a little trouble, labour and expense, and is, as a rule, only resorted to in dealing with established outbreaks of African Coast Fever. It is the most satisfactory method of dealing with that disease, and, since African Coast Fever is such a deadly disease when it gets well hold of a herd, and since there is no cure or treatment, we are fortunate in having a remedy even as simple as "three-day dipping." That it is a certain remedy, we have proved quite conclusively and frequently during the last few years. It will entirely eradicate the disease from the worst infected veld in a comparatively short time, the cattle remaining on the infected veld and being made use of as "tick collectors." This was well shewn in the outbreak at Collaton in Matabeleland, which, although complicated by serious difficulties, such as shortage of grazing and water, yielded within a year to short-interval dipping, as shewn on the chart:—

EFFECTS OF THREE-DAY DIPPING ON AFRICAN COAST FEVER AT COLLATON FARM, MATABELELAND.

Deaths from African Coast Fever.

	1912		Original herd 1,050
Spraying:	January	0	
	February	4	
	March	25	
	April	34	
	May	122	
	June	167	
			352
Three-Day Dipping:	July	19	
	August	20	
	September	15	
	October	3	
	November	0	
	December	0	
			57
	1913		
	January	1	
	February	0	
	March	5	
	April	4	
	May	1	
			11
	Total		420

No further cases, the herd remaining on previously infected veld.

Cattle which have become accustomed to dipping learn to keep their heads above water, and some close the eyelids to protect the eyes; others again whip down the tail to protect the anus. Around these places the ticks collect; why, I cannot exactly explain. It may be that they have an instinct that these places are likely to be protected, or it may be that these positions are not so highly impregnated with dip as the rest of the body. And I should tell you that the skin of an animal regularly dipped becomes impregnated with arsenic. At any rate, in dealing with a severe outbreak, one should also apply from time to time a special dressing to the inside of the ears and other protected parts, and the one recommended is a mixture containing six or eight paraffin wax candles in a quart of paraffin (dissolved by gently warming the paraffin) and applied with a tar-brush.

Thus we see, gentlemen, that science and practice have combined to evolve a system which entirely removes the danger of African Coast Fever and the losses from Redwater (because I need scarcely say that the system which will destroy the brown tick will also destroy the blue).

But the three-day system is a little irksome, and rather inconvenient to apply in practice, although after a time cattle and natives become so used to it that it takes considerably less time and trouble than one might suppose; but for practical purposes, in the absence of African Coast Fever, five-day or even weekly dippings will eradicate Redwater, and will afford a valuable and efficient protection against African Coast Fever, by eliminating the whole of the blue ticks and the great majority of the brown ticks, and by saturating the cattle so completely with arsenic that no self-respecting brown tick can live after biting them, and possibly the African Coast Fever parasite cannot establish itself if by chance inoculated into them.

Your campaign will be all the more complete if it includes all the domestic stock on the farm—sheep, goats, dogs, horses as well as cattle, young and old. All classes of animals improve in condition, and recent reports from the Union even go so far as to claim that short interval dipping is a preventive against Horse-sickness.

There is also another disease of considerable interest to you in this district which may be amenable to dipping, namely, the disease of animals caused by the tsetse fly. There are several reasons why the process of dipping might be tried as a means of controlling this disease. As you know, the tsetse fly is confined to certain areas, and only limited portions of these afford the conditions necessary for the permanent existence of the fly. Moreover, the tsetse fly does not, like the tick, produce many thousands of eggs, but only one larva at a time, and these at intervals of about ten days, and generally not more than ten in all.

In some of the tick-borne diseases, the causal parasites pass from the mother through the eggs to the larvæ, which are capable of carrying on the infection inherited from the previous generation; but in the case of the tsetse fly, the infection arises *de novo* with the adult fly; but only a small percentage of flies obtaining virus offer the conditions suitable for the establishment of the parasite in them, and therefore the number of infective flies is very limited—thus the problem becomes narrowed down considerably. The question arises—How is the extermination of the fly to be brought about? It has been shewn that tsetse flies are attracted by sight rather than by scent, and are to be found in greater numbers around a moving animal than one at rest. The principle of "systematic dipping" of stock against ticks is based upon the supposition that the arsenic taken up from an ox dipped in a solution of arsenic is poisonous to the ticks. In this way the ox becomes a "tick trap." Investigations have shewn that, in an animal constantly dipped, a certain percentage of the arsenic is absorbed, and saturates the lower layers of the skin. If such animals were attacked by the tsetse fly, it is possible that the fly, imbibing blood or lymph containing arsenic, might be poisoned thereby, or that such material ingested might sterilise the fly of the parasites in it, or lastly, that parasites inoculated into an arsenic-saturated animal by an infective tsetse fly might fail to establish themselves in it. This at present, however, is merely thrown out as a suggestion; certain experiments are being conducted on these lines, but definite results cannot yet be published. In the Beira district, Government Veterinary Surgeon Jones is most enthusiastic concerning the beneficial effects of dipping upon fly-struck cattle.

At any rate, enough has been said to-day to shew you the benefits to be derived from "systematic dipping" of your stock. First, there is the protection of your animals against diseases. Secondly, there is the increased growth which may confidently be expected in all classes of dipped stock. Thirdly, there is the increased value of your holding which will inevitably follow the suppression of animal diseases and the greater confidence in this country.

It is not a theory which I am trying to impose upon you. It is a fact abundantly proved in this country and elsewhere. I am not asking you to carry out any experiments for yourselves in this connection—these have already been done for you over and over again. I have no doubt that I shall be met with objections—there are always men more ready to criticise the members of the Veterinary Department than to take their advice; but as far as dipping is concerned, it is nearly always the man who does not dip his stock that raises these objections, and I cannot remember a single regular dipper ever saying anything but good of it.

I am well aware that the chief objection which will be raised is that at the present time there is very little money available for the construction of tanks, and that, of course, is a difficult objection to answer without going into the personal financial position of the man; but, after all, gentlemen, it is only a matter of £100—indeed, several tanks have been erected in this district for considerably less. It is a capital expenditure yielding an enormous interest, and a man who owns any number of stock is no more justified in neglecting to protect them by dipping than is a merchant to provide shelter for the protection of his goods.

I am afraid I have already detained you too long, and I must thank you for the very patient hearing you have given me. If, however, I have succeeded in persuading any of you to adopt the principle of regular dipping, I shall feel that my efforts and your patience will not have been in vain.

Notes relating to Arsenical Dipping Fluids.

By A. G. Holborow, F.I.C.,
Assistant Government Agricultural Chemist.

In the present article it is not intended to present to the reader new theories of research in connection with arsenical dipping fluids, or to place increasing difficulties and labour in his way. Our substance matter is in the form of a review of our present knowledge relating to the subject. In view of the numerous questions which from time to time call for reply by this Department, it was thought advisable to bring together the more important factors in this connection for the information of stock-breeders and others who use the dipping tank.

The oxidation of arsenite of soda has been proved to be due to the influence of micro-organisms which cause, as a part and function of their life, this arsenic compound to combine chemically with oxygen, with the result that another compound, arsenate of soda, is formed. By carefully conducted experiments (Laws), this new substance "arsenate" has been found to possess about one-half the tick-killing power that it originally possessed in its arsenite condition, and its scalding effect is proportional to its tick-killing power. In view of the fact that under favourable conditions oxidation is liable to progress to a considerable extent, it is not unnatural that attempts have been made to devise some means to inhibit this action. As a general rule, micro-organisms succumb to the toxic influence of powerful disinfectants. Corrosive sublimate, boric acid, formalin, and carbolic acid were introduced into samples of dip experimentally. This specific organism was found to be immune and oxidation proceeded as rapidly as in the control sample. It is interesting to record again that oxidation was somewhat arrested by the constant dipping of a fair number of cattle. Our experience with three tanks near Salisbury shews that oxidation at first proceeds rapidly until between 15 and 20 per cent. of the arsenite has been changed. After this the process is reversed until eventually only a small amount of arsenate is found in the fluid. In each of the three dipping tanks quoted, 500 head of cattle were dipped once a week. This reversion is explained by some to be due to other organisms which under existing conditions come into play, and tend to re-convert the arsenate of soda to its original condition. The necessary continual addition to the tank of arsenite of soda to replace that taken out by the cattle during dipping may also have some influence in keeping the dip in good condition, for arsenate is being constantly replaced by arsenite.

There appears to be no fixed rate of oxidation that can be applied to all dipping fluids alike. Two tanks near Salisbury, and not more than two miles apart, were emptied and filled with newly-mixed dip within a day or two of one another. Three months later, although conducted under precisely similar conditions, " A " registered 40 per cent. and " B " 19 per cent. of oxidation respectively. There is no means of judging how far oxidation has proceeded in a given time except by analysis. This brings us to the question of the Isometer appliance for testing dips. This is a contrivance instituted by Col. Watkins-Pitchford for the progressive farmer who is anxious to keep his dipping fluid at tick-killing power: and, moreover, to test his dip on the farm if in doubt of its strength. It is well to explain here how far the Isometer is capable of doing this. Dipping fluids almost invariably shew oxidation, *i.e.*, the change of sodium arsenite to sodium arsenate, and it is unfortunate that the Isometer is only capable of determining the arsenite, the whole of the arsenate being unrecorded. Serious error may or may not result through this defect, but it is well to allow for the toxic effect of arsenate of soda when calculating the strength of a dipping fluid. It is to be regretted that no simple apparatus like the Isometer has yet been devised for farm use by which both arsenite and arsenate can be registered in a dip.

For those who send their samples of dip to the Government Laboratory and receive a certificate of analysis in return, it may be desirable to explain the terms of the report. We will suppose that the following is the certificate received upon a sample of dip submitted for testing :—

> Arsenic present as arsenious oxide, 0.083 per cent.
> Total arsenic in terms of arsenious oxide, 0.153 per cent.
> The sample contains an equivalent of 1 gallon Cooper's Improved Cattle Dip in 211 gallons water.

Explanation.—When analysing a dip, it is necessary to ascertain the amounts of the two forms of arsenic, viz., arsenite of soda and arsenate of soda. As we have explained, arsenate of soda is merely arsenite of soda which has been oxidised. In the report, therefore, arsenite of soda is given as "arsenious oxide, 0.083 per cent." The difference between this figure and that of " total arsenic, 0.153 per cent.," gives the amount of arsenious oxide, 0.07 per cent., which is present in the dip in the arsenate condition. In calculating the strength of a dip, therefore, one deducts half the arsenate of soda, since this substance has, as far as we know at present, only half the tick-killing power of arsenite.

It should be an easy matter, knowing the volume of the liquid in the tank and the exact strength of it, to rectify any deviation by the addition of water only, or dip, as the case may be, and bring the dipping fluid to any desired standard strength.

Dip at Standard Strength.—When a dip in a tank evaporates, water only passes off into the air; therefore, a dipping fluid gains in strength in proportion as it diminishes in bulk by evaporation. Cattle on passing through a tank take out water *and* arsenic, and the dip remaining in the tank, though diminished, is of the same strength as before dipping. Again, flood water entering a tank weakens the dipping fluid in proportion to the volume of water that has inadvertently entered. Each of these three axioms, then, should be considered, if a dip is to be kept at a standard strength. It is considerably easier, and accurate, to make records in a notebook kept for the purpose, than to guess at volumes. Let us start just before dipping the herd. The height of the fluid in tank is taken with a measuring rod, and after the last beast has emerged the height of the fluid is again taken. The difference on the measure can be read off in gallons. Now, replace the lost dipping fluid with a fresh mixture of dip and water, and note in the book the height of the liquid in tank. On the next dipping day we may find that the level of the dip has again sunk. This is due to evaporation, and the volume lost is replaced with water only. On the other hand, especially during the rainy season, we may find that the volume of the dip has swelled. The new level is taken by means of the measuring pole, which shews, by difference, the volume of extraneous water in gallons. Pure dip, then, is now added to the fluid in the tank in such quantity as to convert into dipping fluid this excess of water due to flooding.

When to Change the Dip.—To know when to change the dip has often been the subject of enquiry. It is of moment to have some definite knowledge on this question, and to be able to say with some degree of certainty whether it is necessary to change the dip on account of oxidation only. From experiments conducted in April, 1914, the conclusion then drawn was that there is no necessity to renew a dip through which a fair number of cattle are constantly passing until it has become too dirty for use. For a Rhodesian tank under average conditions, this appears to become necessary about every six months, but it is difficult to lay down any fast and precise rules.

The question has been raised as to whether arsenic may be precipitated in the sludge which accumulates at the bottom of a tank, especially at the deeper end. To clear up this doubt, samples of the mud have lately been taken and examined, with negative results.

A Note on Contagious Abortion.

By LL. E. W. BEVAN, M.R.C.V.S.,
Government Veterinary Bacteriologist.

Within the past year outbreaks of contagious abortion have come to the notice of the Veterinary Department, and although these have been of a mild character it is desirable that stock-owners should be on their guard against this insidious disease.

Commencing with a few isolated cases, the infection may become established in a herd, causing a very serious loss in calves for several years; it is, therefore, desirable to detect the first cases, in order that measures may be adopted to limit the infection. At one time, owing to the absence of any very remarkable features to distinguish the specific disease from accidental cases of abortion, this was a matter of considerable difficulty, but recently a very reliable laboratory test has been discovered whereby the presence of the disease can be detected by certain properties in the blood-serum of the infected animal.

As the result of experiments in the Veterinary Laboratory, Salisbury, the technique of this test has been so simplified that any stock-owner can himself obtain the blood from a suspected animal, and forward it to the laboratory in a suitable condition for the test. A stock of the materials necessary, and full particulars as to the process, can be obtained from the nearest officer of the Veterinary Department, or direct from the Veterinary Bacteriologist, Salisbury.

The detection of this disease greatly depends upon the good faith of the stock-owner himself in reporting cases coming to his notice, as the only way in which its presence can become known to the inspector of cattle is by the remarkable shortage of calves in a herd where it has become firmly established. It is to the interest of the stock-owner himself to avoid such a state of affairs, and this he can easily do by having his suspected animals tested.

It is true that infected farms are placed in quarantine, but now that the disease can be controlled by preventive measures, and can be successfully combated by a process of vaccination, the quarantine need not last longer than a few months, if the matter is promptly dealt with. This temporary inconvenience is little as compared with the losses which may accrue if the disease is allowed to run its course unchecked.

Experiments with Wheat.

We have received, through the Civil Commissioner, Victoria, the following interesting particulars concerning certain experiments with several varieties of wheat carried out this season by Mr. L. P. Spies as winter crops on his farm Springfield in that district. Seven different strains of wheat were tried, and notes kept as to which proved the best resisters of rust and the heaviest yielders. The report is as follows:—

Golden Ball.—Prolific ears, heavy grain, bright and full. This is a bearded variety.
Rust Proof.—Second best; results good.
Talavera.—Third best; results very fair.
Els Koren.—Practically the same as Talavera.
Scots Koren.—Badly rusted and useless.
Klein Koren.—Badly rusted and useless.
Wol Koren.—Badly rusted and useless.

Both Algerian and Boer oats yielded splendid results on similar ground. All were grown on black granite vlei soil, without artificial or other manure. Cultivation was much hampered in the early stages by the humidity of the soil, with the result that the ground was far from clean.

The yield per acre would add to the value of this report, but it was not given. Accounts of practical experiments of this nature made by farmers are always appreciated, and we should be glad to receive more of them.

Irrigation of Citrus Groves.

By W. H. Swain.

The control and distribution of water are matters all-important to growers of citrus trees, and these subjects should receive very careful consideration and forethought before the planting of the grove. Unless this is done, a scheme evolved and works of a permanent nature installed, it is often more difficult and expensive to do so afterwards; for one reason, if for no other, that primitive and careless methods cause scour and damage which has to be made good. Certain it is that conditions of soil, water supply, contour of land and fall are not often the same, and therefore no hard and fast rule can be laid down as to the best system of distribution and control. The grower should, however, adopt the broad principle, and work out a scheme best suited to his particular conditions.

Like many other subjects, irrigation sounds very well and easy on paper, but actually it is by no means so simple, and in the hands of the careless or inexperienced no end of damage may be done. In all irrigation, the proper control of water is essential. It not only means less labour in application, and obviates scouring and the washing of the best soil to the sea; it means also the possibility of utilising the available flow of water by night as well as by day. Lastly, it makes it possible to estimate the amount of water approximately per acre being applied. A grove is not laid out and planted for a year, or a few years, but for a lifetime and future prosperity. It is, therefore, good business to do it properly from the word "go."

Uneven ground and depressions to which storm water flows and collects must be first levelled and filled up and means taken to prevent the recurrence, otherwise trees planted in such positions cannot be properly irrigated, and will sooner or later be washed out.

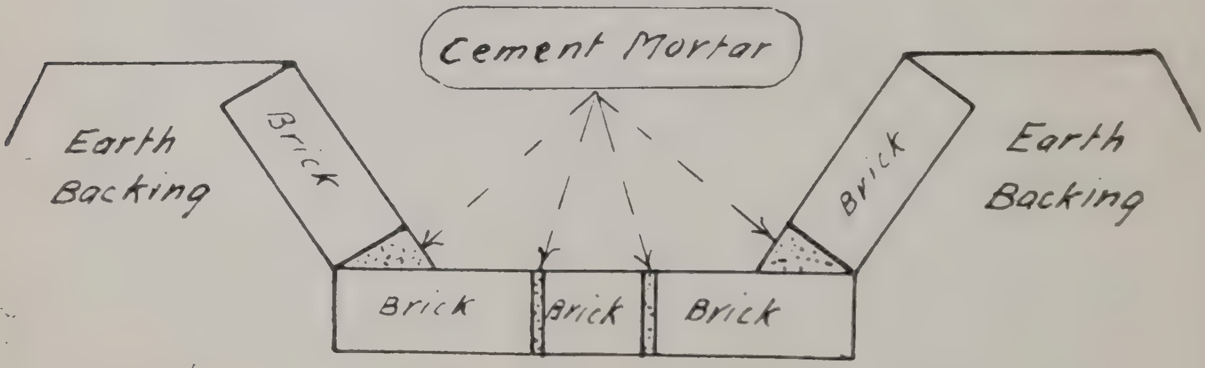
The planting of the grove previous to the irrigation scheme being put down in a permanent manner, is a cart-before-the-horse policy, and a mistake. Citrus trees will not stand hardships, and unless water is available, and can be applied in an efficient manner and in proper quantity when the trees need it, the newly-planted grove will be pretty certain to get a serious set-back at an early stage of its growth.

With these preliminary remarks, I will endeavour to give a brief description of the flume, system of control and application, now being installed on the B.S.A. Company's Premier Estate.

The flume I am about to describe runs along the upper side of the orchard, and feeds all the trees lying below it by a system of small distribution furrows.

The cost of construction has not been lost sight of, and it is thought that the flume is one that could be built by any grower at no great expense. The principal materials are bricks and cement. For the purpose of this estimate, bricks are taken as costing 20s. per 1,000, and local cement at 16s. per bag, delivered on the spot.

The flume is constructed of bricks throughout, the floor being the first part laid. The ground is first stamped firm and given an even grade. The bricks forming the floor are then laid on the surface of the ground, two side ways and one end way to the direction of the flume (see diagram), and grouted in with cement mortar (one cement to four sharp sand). At intervals riffles are formed by placing two bricks on edge across the flume, which project about 1½ inches above the rest of the floor. After the floor has set firmly, the sides are built—the bricks forming them are placed on the floor on end with an



Section of Flume

outward lay or batter of about $2\frac{3}{4}$ inches. They are built with dagga mortar, the joints being afterwards scraped and cement-pointed. Six distribution gates are placed at intervals of 3 feet apart, the first one being 4 feet 6 inches from the first line of trees, and the sixth 4 feet 6 inches from the next line, and so on. The trees are planted on the square, 24 feet apart. Thus there are six gates and six distribution furrows leading from them between each two rows of trees. The gates are placed immediately above the small riffles already mentioned, and are on a level with the floor of the flume, and at right angles to it. They are constructed very simply by a wooden plug, tapered from 2 inches to $1\frac{1}{2}$ inches diameter and 9 inches long, being bedded in cement-mortar and capable of being withdrawn whenever it is desired to lead water. On the outside of the flume at each outlet bricks are placed, to form a channel to prevent the water undermining the flume and earth backing. The outsides of the flume are backed up with earth and planted with grass.

At the head of the flume a principal sluice gate is constructed, opening from the main furrow, by which the intake of water can be regulated. When it is desired to irrigate, the furrows between the trees are first struck with a plough or other implement, one opposite each small outlet. When the irrigation of the upper section is completed, the outlets are plugged and the water flowing on percolates in the same way from the lower sections of the flume. This flume will be, when completed, some 500 yards long, irrigating laterally throughout its length 30 acres. At present half is completed and in use. The scheme has worked most satisfactorily. The saving of labour alone will soon pay for the cost of construction. There is very little that can go wrong, and if the bricks are good and well burnt, there is no reason why it should not last for many years, and repairs are easily effected at any time at little or no expense.

Estimated cost of material per yard:—

	s.	d.
say, 50 bricks at 20s. per 1,000	1	0
Cement at 16s. per bag	0	$7\frac{1}{2}$
	1	$7\frac{1}{2}$

A Cheap Silo for Mashonaland.

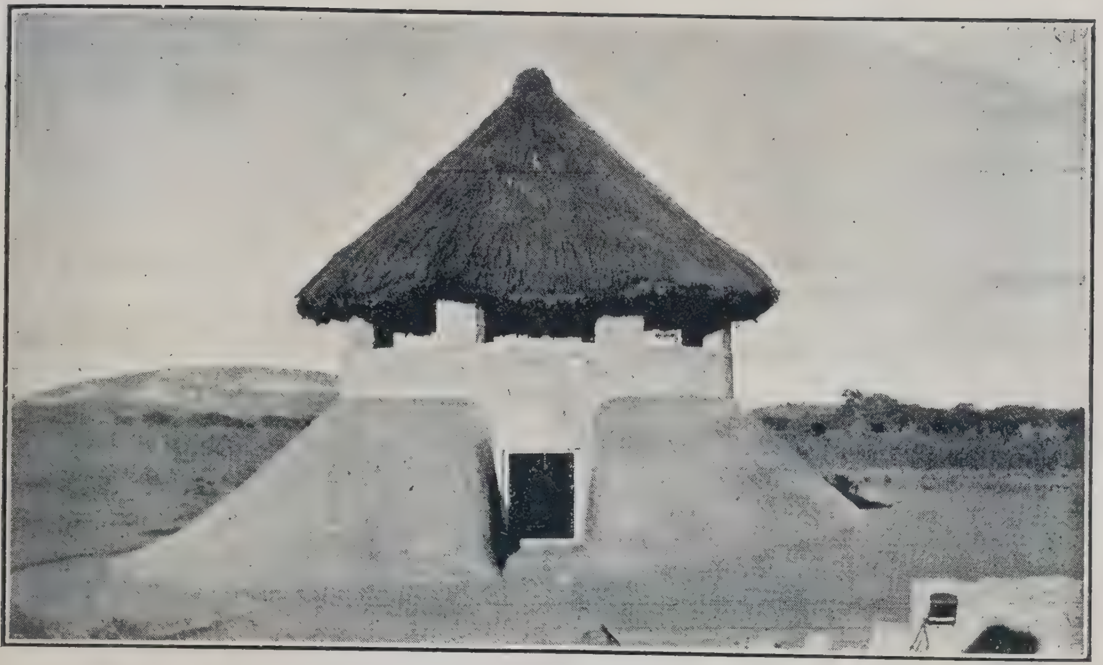
By H. Kay Scorror.

It is well known to those cattle owners in Mashonaland who have introduced improved blood into their herds of native cattle, that during the months of May to November the cattle fall off in condition when grazed entirely on the veld. Twenty to twenty-five per cent. of the cattle may lose condition, whilst the balance of the herd remain fat or in fair condition. As a rule it is the cattle having a predominance of improved blood in them, or cattle of a naturally weak constitution, which fall off in condition quickly when winter sets in and the grass becomes dry.

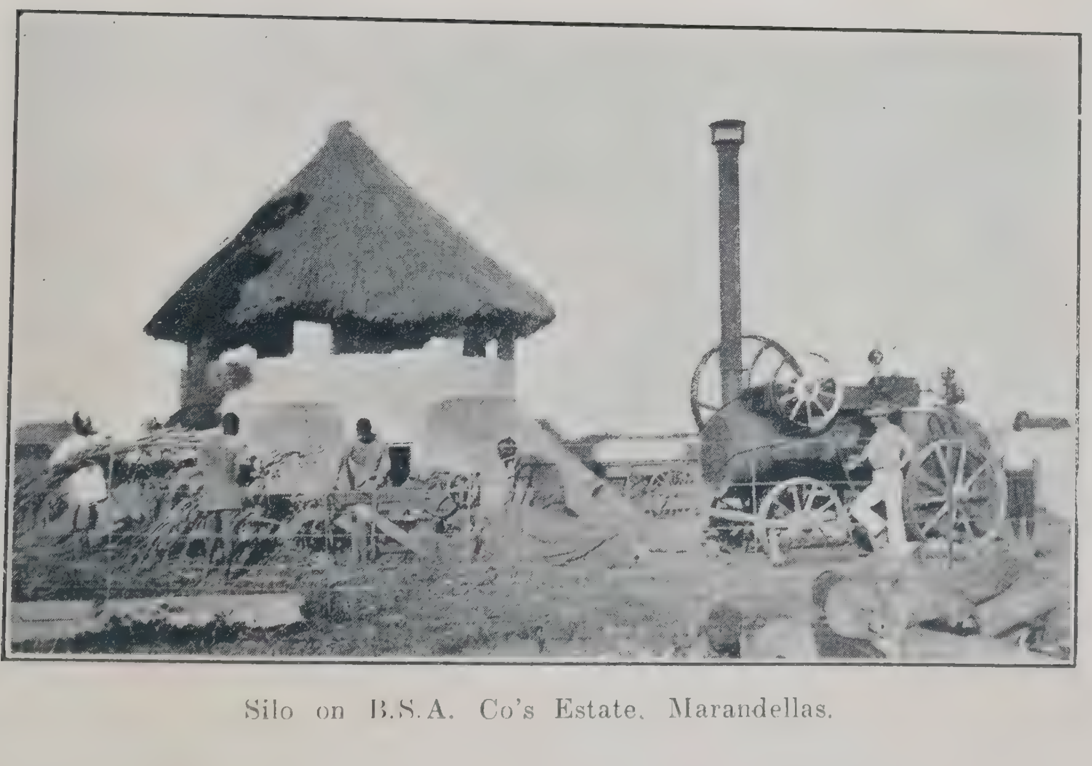
These 20 to 25 per cent. of the herd need feeding to prevent loss. Dry foods, such as veld hay, forage and mealie stalks, in themselves do not give the cattle what they require. A ration of ensilage fed with these and other dry foods will keep the stomach in healthy working order, and ensilage is in itself a rich food, containing the natural juices of the growing plant.

The illustrations here given are of a simple, cheap and easily built silo at present in use on the B.S.A. Co.'s estate at Marandellas. These silos have been in use for two years, and have proved satisfactory. The material required is 8,500 well-burnt bricks and 500 burnt or sun-dried bricks for the top weight. The site chosen should be as near the proposed feeding kraals as possible to prevent the ensilage having to be carried any distance to the feeding troughs. The site should be on high dry ground, and if possible free from white ants.

The earth taken from the pit should be dumped close to the pit edge, just far enough away to prevent it falling back again before the brickwork is complete. The underground section is a pit 15 feet 9 inches in diameter and 15 feet deep. Care must be taken to keep the side trimmed and perpendicular as the



Silo on B.S.A. Co's Estate, Marandellas.



Silo on B.S.A. Co's Estate, Marandellas.

earth is taken out. Level the floor of the pit, and brick line it, placing the bricks close together and not using dagga between the joints.

Line the side of the pit up to the ground level with 4½ inch brick-work, using as little dagga as possible between the inside face joints, but firmly fill in the back of the brick-work with good dagga. From the ground level carry up the above-ground section in 9 inch brick-work to a height of 10 feet, leaving a small door 2 feet 6 inches by 3 feet 6 inches at the ground level. This door should open inwards, and be flush with the inside face of the brick-work. Lay a 12 inch concrete base on outside of the 4½ inch wall at ground level where the 9 inch wall springs from the 4½ inch wall. The roof is supported on eight brick pillars 3 feet high, continued from the top course of the brick-work. These pillars are 1 foot 6 inches wide, and of the same breadth as the main brick-work. Pieces of hoop iron should be built into the tops of the pillars to bind the roof plates. The roof plates can be made of native timber, and are carried from pillar to pillar and bound down with the hoop iron. The roof plates should be nailed together where they meet on each pillar, to prevent outward pressure of the roof. The silo is roofed with a native hut thatched roof, built up on the roof plates. It is advisable, but not necessary, to give the above-ground section a cement wash on the outside. The whole idea is to make the 25 feet brick cylinder as airtight as possible.

When the brick-work is dry, pack all the earth taken from the excavation round the wall, as shewn in the illustration. This drains the summer rains from the vicinity of the pit, and also helps to keep the above-ground section more airtight.

In cutting a crop for ensilage, it should be loaded on wagons directly it is cut and taken to the silo. Mealies and kaffir corn are ready to cut for ensilage when the grain is in the hard dough stage. It is better to chaff your ensilage into 1 inch lengths. This allows it to pack better, and is more convenient to handle when feeding. When filling the silo, keep levelling as you fill, and trample round the wall sides. When the ground-door level is reached, shut the door and fill from the top from between the roof pillars. Fill the silo up level with the top course of bricks. It is now necessary to weight it. A good simple form of weight is to cover in the top with three or four layers of bricks, loosely packed, to allow them to sink as the ensilage settles. It is also a good plan to brick up the ground-door; this will make it more airtight. The bricks can be knocked out when required.

The ensilage is ready to use in six weeks to two months. The ensilage will first be used from the top between the pillars. When the ground-door is reached the door will be taken out and the ensilage used from the ground level. In using, care should be taken to take off the daily supply evenly and keep the ensilage level.

The silo has an inside diameter of 15 feet and is 25 feet deep. This should hold 80 tons of ensilage. This will feed an allowance of 25 lbs. of ensilage per day to 40 head of cattle for five months. The silo will hold from 20 to 25 acres of fair crop of mealies or kaffir corn.

Silage.

"There is no longer any question in the mind of the intelligent feeder but that silage is as nearly an ideal dairy feed as ever has been devised by the artifices of man. Its bulk of tender, succulent stalks and blades, the rich juice from them, and the goodly percentage of rich, nourishing grain, all combine to make it the greatest feed even given dairy cows; of course, best results will be realised by feeding with it a limited quantity of good, clean clover or alfafa hay. A silo 14 feet in diameter and 24 feet high will hold 70 tons of silage. This will feed 20 cows (40 lbs. silage per day) for a period of six months. It will require about seven acres of corn to fill a silo of the above capacity. How many cows will your seven acres of corn sustain if the product is handled as fodder or stalk-feed? Its convenient form for feeding makes it easy for the dairyman to give uniform rations by weight. There is practically no waste, the cows consuming every atom."—*The Dairy.*

Poultry Keeping for the Rhodesian Farmer.

By FRANK SHEPPARD.

As the majority of our birds are now moulting, there should be no more eggs used for hatching. Chicks hatched from hens which have been running with male birds since early in the year will give very poor results. All the male birds should, of course, be separated. I am pleased to find cases of farmers who have already separated their young cockerels and are also penning up their adult male birds during the moulting season. If poultry keepers who do not carry out this annual separation of their stock would realise the difference it makes to their breeding birds, and the small amount of trouble and expense incurred, there would be no delay in the erection of suitable bachelor quarters for their male birds. I have recently seen an excellent range of cockerel pens, the sides and back fencing being made of sunflower stalks, and the fronts of wire netting. Each pen was provided with a small house of either brick, iron or wood. These houses not only served their purpose admirably, but also proved a good means of utilising the small scrap building material which is to be found lying about on almost every farm. If separate cockerel pens are not provided, a large run may be used instead. If this is large, and out of sight of any hens, and all the male birds are put in at night at the same time, there will be little fighting. If there happens to be one chronic fighter amongst the birds, he can generally be cured by being roughly handled by the poultry keeper himself. If a few smart blows on the head and body are dealt out to him while he is engaged in fighting, he appears to imagine he is getting the worst of the battle, and that he is not master of the pen, and will be no trouble afterwards.

As there will probably be no suitable dusting material in the cockerel pens, except the floor of the house, which is not a desirable place, two or three low-sided boxes, containing a mixture of dry sand, wood ash and insect powder, should be kept in readiness, and placed in the pens on fine days. The birds will soon take to these, and when it is found that a bird has thoroughly cleansed itself, the box may be removed to another pen, and so on, till each bird has been provided for. The dusting box is best made with three high sides and one low one, which will prevent undue waste of dusting material.

All surplus male birds and old hens should now be disposed of. They should not be kept over the moult, as during this period they give little or no return for their keep, and by their disposal more room is provided for the young stock.

Early hatched pullets should now be laying well. Those which are to be used as breeding birds next season should not be forced in any way for egg production.

From now to the end of March is the slack season amongst the majority of poultry breeders in Rhodesia, and, as this is the case, there is little to say as regards the work to be done at the present time. With the advent of the moult, all hatching should be at an end, if it has not already terminated. The number of broody hens available at this time of year induces many people to continue hatching, but this is a great mistake, unless it is intended to rear a few birds for table purposes. All coops, brooders and small chick houses, which are not required till next season, should be thoroughly cleaned and sprayed and stored away in a dry place. Incubators should be well washed out, and the tank in hot water machines should be emptied. It is not necessary to light the lamp to dry the tank thoroughly. If the water is let out immediately after the chicks from the last hatch have been removed, there is enough heat in the incubator to dry the tank. All breeding pens, and birds which have been penned up in small runs, should, if possible, be removed to fresh ground. The pens should be dug over, and if a crop is grown, the ground will be sweet and healthy for next season.

If it is intended to extend the poultry plant next season, the alterations should now be planned out, and quick-growing shrubs and trees planted, if there is little shade on the new ground decided upon. If the young stock has been reared in small runs, these should be moved to fresh ground each season, and now is the time to make preparations for the rearing of next season's birds. If this is left till early next season, the first chicks will probably be hatched before any accommodation has been provided for them.

All houses from which the birds have been removed should be thoroughly cleaned and sprayed, and, if a scratching shed has been used, this should also receive attention. All repairs to plant and appliances should be done now. It is fatal to leave these over, as the busy time of hatching and rearing will be upon us before they are completed. Hinges, bolts and locks in exposed places should be attended to and not allowed to become clogged with rust.

The young stock must now be properly housed, as during the next two months we expect the worst rains. Mature pullets which are made to roost in draughty grass huts and in trees will not come on to lay satisfactorily till after the wet weather, and those which have already started to lay before the rains will probably stop if not provided with proper sleeping quarters.

There should be no likelihood of rains getting into the nests, as, not only are the eggs liable to become tainted through the damp litter, but they readily become stained, which renders them unsuitable for market purposes.

Since the February issue of the *Agricultural Journal*, these articles on poultry keeping have been more or less short monthly notes on the routine of work throughout the poultryman's year. There has been no attempt to deal fully with any one particular subject. In the future we hope to deal with the most important subjects separately, and when a few hints have been given as to food, feeding, disease, housing and general management of poultry, we trust that the live stock and agricultural statistics of future years will shew a better return than the small figure of nine eggs per head of poultry sold by the farmers of Mashonaland in 1914.

Steam Tractor Ploughing.

By F. Eyles, F.L.S.

A demonstration of ploughing by steam tractor was given near Salisbury during the month of October. Such exhibitions do good by directing attention once more to the question, still an open one, as to whether steam or other mechanical power is more economical than the use of draught animals for ploughing purposes. Steam tractors for farm work are no longer in the experimental stage. They have now been brought to a high standard of efficiency in respect to simplicity of construction and capacity for work. Practical farmers when attending these demonstrations may constantly be heard to express their admiration in regard to working power and quality of ploughing. The point on which they always seem to be uncertain is, "Will it pay to invest in a steam plant?" It is strange that the manufacturers themselves so frequently overlook this most vital point. After all, the farmer is a cautious person, and he cannot often be induced to put his money into a machine simply because it works well. He very rightly wishes first to be satisfied that it can be employed profitably. Yet the makers, who presumably build tractors with the object of selling them, when asked to give definite figures for the cost per acre for ploughing, generally shelter themselves behind the statement that farming conditions are so variable it would not be safe to pass any guarantee. Of course, this is true, and of course, also, the farmer will not buy because he remains in doubt. He refuses to place a large part of his small capital in an undertaking the business value of which is still problematical. There seems an easy way out of the difficulty. These demonstrations are usually on a small scale, and for a short period only, but they run away with a lot of money, while from the seller's point of view they are not highly successful as advertising devices, largely, we believe, for the reason given above. It occurs to us that manufacturers would lay out their money to better advantage if, in place of several brief displays, they would concentrate on an extended demonstration in any district as soon as they decided to invade it for trade purposes. For instance, a piece of ground, not less than 100 acres, might be selected in a particular district. It should be composed of the typical local soil, and be ploughed in the dry season. Any firm wishing to prove the value of its special tractor might undertake to plough such an area as this under conditions allowing inspection at any time by farmers and others interested. Strict account would have to be kept of costs of labour and fuel, and all other ordinary and contingent expenses, as well as of the precise amount of work done daily, the number of break-downs, and the total time taken to complete the work. A carefully prepared statement might then be issued, shewing the exact nature of results obtained, and it could easily be arranged that this should be certified by some independent person. Then, if results were anything like those claimed by manufacturers, the particular engine which had been subject to test would stand on established merits, and there might be found farmers, or combinations of farmers, who would become purchasers.

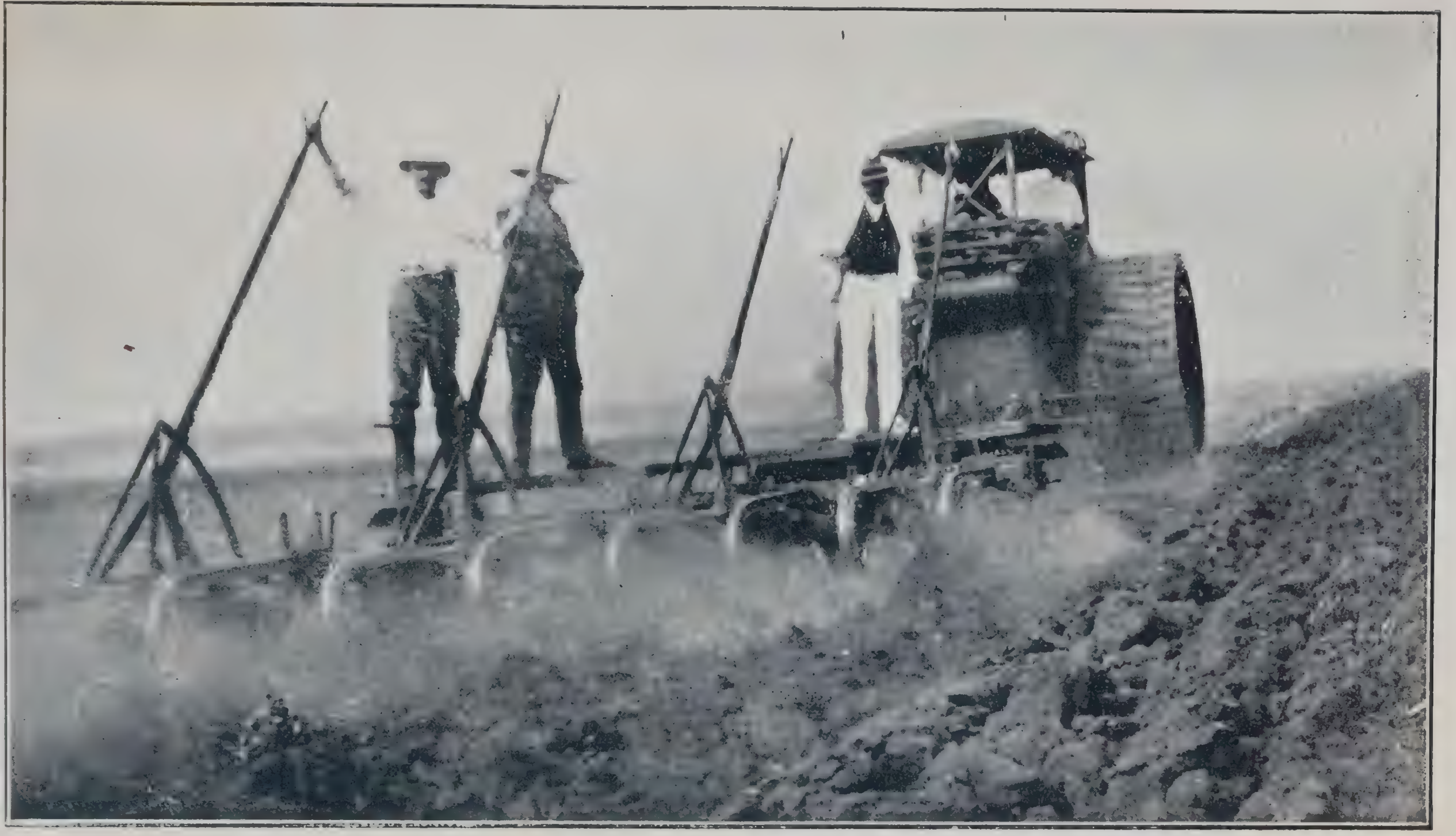
Meanwhile it may be of service if we examine the figures at our disposal, in order to discover so far as possible what are the relative advantages and disadvantages of ploughing with oxen and with steam tractors. We publish in this issue photographs of three makes of plough tractors which are being offered in this country. They are the McLaren engine, used in the October demonstration at Salisbury; the Robey, of which type two are in actual use on Rhodesian farms; and the Marshall, which is working in Portuguese East Africa. They may be regarded as representative of their class. There are differences between the engines illustrated in respect to price, weight, power, etc., and each claims certain distinctive features of superiority. We do not purpose to institute a comparison between them, but will take approximate figures and see if we can arrive at any idea as to probable working costs and return to be expected from capital. We will not enter into technical details of design, such as simple and compound engines, super-heating, gear arrangements, etc., for, important as these are, they are better left for the individual selling agents to emphasise when treating with prospective customers. It will be simpler to confine attention to the plain results that are easily understood by practical men who may be ignorant of machinery.

Two of the engines illustrated are stated to be about 45 actual horse-power. Their weight is from 8 to 9 tons gross. The third, Marshall's, which weighs 15 tons, is described as 32 effective horse-power. They have a speed for ploughing of two to two-and-a-half miles an hour, and for road transport from four to six miles; these speeds being controlled by movable gears. They are specially built to be driven by either coal or dry wood, or by a mixture of wood and coal; but we shall base our calculations on the assumption that the farmer will use wood cut on his farm. The price of this class of tractor of the lighter type is between £700 and £900, complete, without ploughs. We will take the intermediate figure of £800 for a steam tractor delivered in Salisbury, and to this must be added (say) £100 for a set of ploughs, chains, etc., making a total outlay of approximately £900.

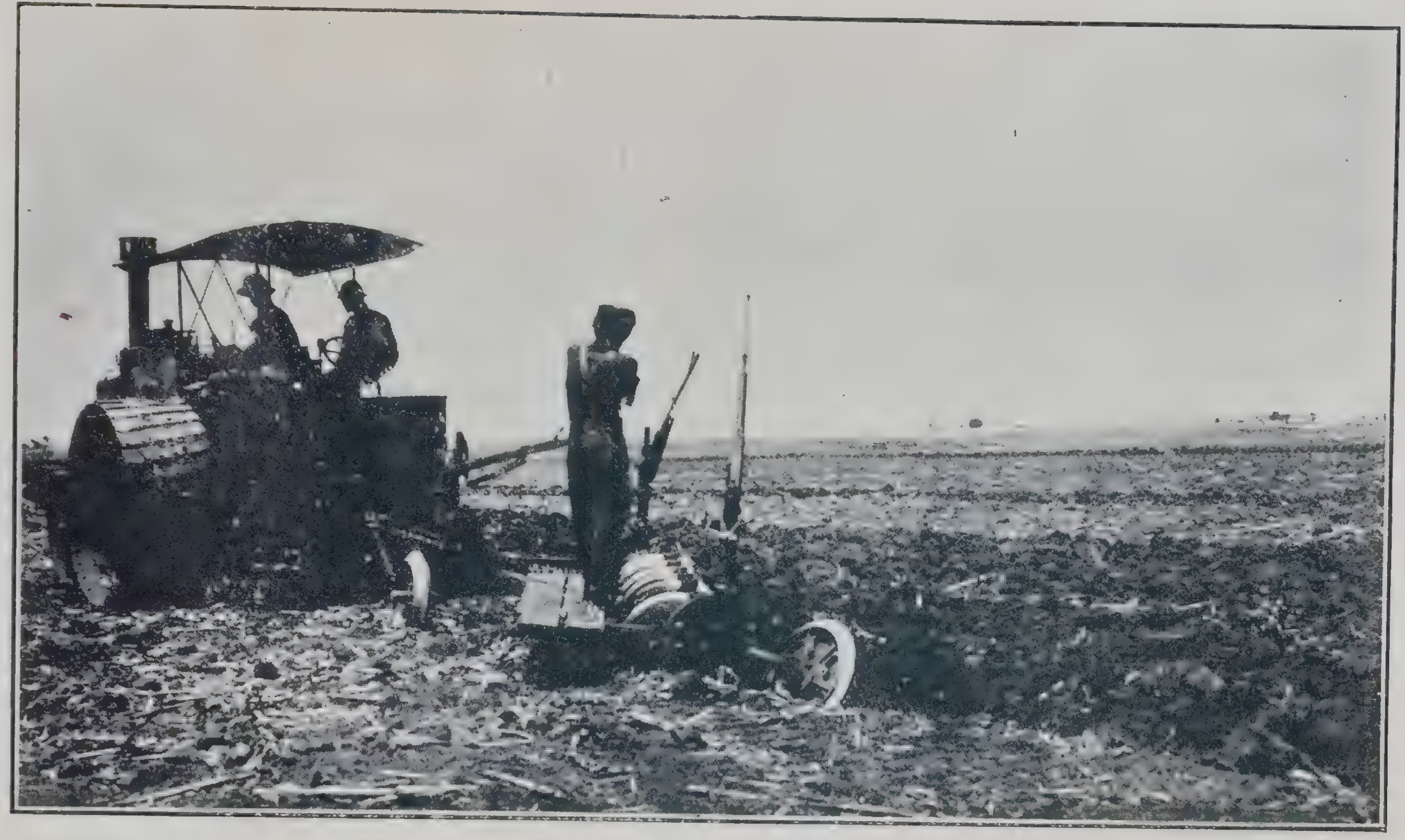
In making a comparison between cost per acre of ploughing by tractor, as against ploughing with cattle, we shall assume that the engine is driven by the farmer himself without any charge to the account. If a European driver is employed, the cost will be nearly doubled. All figures are estimated on what are taken to be fair average Rhodesian conditions.

Monthly Working Costs of Steam Plough Plant Costing £900:—

Engine boy, to attend driver	£2	0	0
Plough boy	1	5	0
Two boys riding water	2	0	0
Two boys cutting and riding wood ...	2	0	0
Oil, packing, etc.	1	10	0
Up-keep, wear and tear	2	0	0
Monthly disbursements	10	15	0
Depreciation at 15 per cent. per annum	11	5	0
Interest on capital at 8 per cent.	6	0	0
Total cost per month	£28	0	0



Marshall's Steam Tractor, Mandegas, P.E.A.



McLaren's Steam Tractor, Salisbury.

The amount of ploughing done by this description of plant varies from 10 to 15 acres per day of 10 hours. If we take the intermediate figure of 12 acres per day, and allow for twenty days' ploughing in each month, we get a total of 240 acres ploughed per month. This, on the above estimate of running costs, works out at exactly 2s. 4d. per acre. (See note below shewing how this may properly be reduced to 2s.)

In the above, the figure £100 for a set of ploughs is only an estimate, and may be too low. With respect to the heavier type of plant, the figures we have are for a complete outfit, including not only an eight-bottom gang plough, but also eight extra breaker bottoms, a suitable disc harrow and a water cart. The total cost complete in Salisbury is £1,500. If we take the monthly disbursements as being the same as for the other engines, viz., £10 15s., and add depreciation and interest on £1,500 at 15 and 8 per cent. as before, we get a total monthly working cost of £39 10s. But it is claimed for this plant that it will plough from 15 to 25 acres per day, according to conditions. The middle figure, 20 acres, gives 400 acres ploughed in twenty working days. This works out at a fraction under 2s. per day for ploughing, which will be reduced if a portion of interest and depreciation is charged against work other than ploughing.

For comparison, the average cost of a four-furrow disc plough, complete, with full team of oxen and all necessary trek gear, may be taken as about £200, and the working expenses somewhat as follows:—

Monthly Working Cost of Four-Furrow Cattle-Drawn Plough:—

Native driver	£2	10	0
Plough boy	1	0	0
Voorlooper	0	10	0
Oils, etc.	0	5	0
Up-keep	0	10	0
Monthly disbursements	4	15	0
Depreciation at 20 per cent.	3	6	8
Interest at 8 per cent.	1	6	8
Total cost per month	£9	8	4

If we allow that this plant will plough four acres a day, an average seldom maintained for long periods, and that, being a simpler and more familiar instrument, it will be less liable to stoppages, we may count on twenty-four days' ploughing per month, making a total of 96 acres ploughed. On the above estimate of running costs, this works out at 1s. 11½d. per acre, say 2s. per acre.

Considered, therefore, purely as a ploughing machine, and looked at only from the point of direct working costs, the steam tractor shews no economy over the old-fashioned trek ox. But this is too narrow a way of regarding the matter. A steam engine is something very much more than a simple ploughing machine, for it can be utilised for many other important farm operations requiring power for which oxen cannot always be used, such as mealie shelling, meal grinding, pumping, silo filling, road transport, etc. Indeed, so certain is it that no farmer would bring on to his steading so expensive and valuable a plant without using it for such general purposes, that it is only fair that a considerable portion of the charges for depreciation and interest should be put against items other than ploughing. If 25 per cent. of these two charges are transferred in this way, the cost per acre of ploughing with the lighter engines is brought down to just under 2s., or the same as for oxen, and with the heavy type to less. It is probable that this is a just estimate.

But even if a steam plant is used only for ploughing, and it is admitted that the direct cost is 4d. or 6d. an acre higher than with animal draught, it does not necessarily follow that the steam outfit must be rejected as an uneconomical investment. Many other factors must be considered besides direct running costs.

The special advantages claimed for a steam plant may be summarised as follows:—

Harder and tougher land can be broken than with ox teams.

Large areas can be quickly prepared for seed by putting the tractor to work directly the crops are off the land, and while the ox teams are still busy with harvesting and riding on other parts of the farm.

A steam plant enables the farmer to reduce the number of draught cattle on his place, to the advantage of his breeding herd where pasturage is limited.

A tractor is a good stand-by in the event of farm work being interfered with by an outbreak of disease.

Most important of all, deeper and better work can be done, owing to the weight of the plough sets and the steady reserve power of the engine. This capacity for deep ploughing, if used with judgment, should mean deeper seed beds and larger crops; and, to quote from the British "Implement and Machinery Review" for October, "If an extra quarter of corn to the acre can be grown through the aid of steam (and experience has shewn that it can), then the employment of steam becomes a very good investment." But here a note of warning must be uttered. Deep ploughing can easily be over-done. When the steam plough first came into use, it was thought that by the addition of a few inches in depth of ploughing a farmer might much increase the productivity of his land. "But," says Stephens, "it was found that harm instead of good was done, by burying useful soil and bringing up in its place sour unkindly sub-soil." A great deal of injury was done, and on many farms it took several years of expensive manuring and tillage to bring the land back to its old fertility. "As a general rule, it may be laid down that the furrow should be as deep as the nature of the soil and sub-soil will advantageously permit."

The conditions under which a steam tractor is not recommended even by the makers should also be noted. Some makers admit that on loose sand they are useless, for instead of travelling forward, they simply dig themselves in. Other makers claim that their machines will work, with reduced capacity, in pure sand. They are not suitable to work during heavy rains or in wet lands. Also they will certainly be an unprofitable investment if they are bought by any man who cannot give them full employment. Although the running cost may be little more than that of oxen, it would be foolish for a farmer who tills only two or three hundred acres to lock up £1,000 or more of capital, when he can get the work done by an investment of £200 to £400. On the other hand, a farm with one thousand acres of land under crops could hardly be carried on without four teams of plough cattle, or an investment of about £800, that is, the same as for the light type of steam plant. In such a case the purchase of a tractor is worth consideration, especially where the arable land is in large blocks, and the soil of a uniform character. One thousand acres of ploughing seems to be about the minimum area that might justify the use of steam power.

It has been suggested that it might pay co-operative groups of farmers to combine for the purchase of steam tractors, which could do the ploughing on a number of adjacent farms. This is feasible, provided that great care is taken in drawing up the agreement, and arrangements are made for the plant to be kept at work out of the ploughing season.

Another note of warning. Let no man be persuaded to buy a steam plant unless the seller guarantees to stock a good supply of spare parts.

We repeat that the above figures are only estimated, although based on the results of actual trials and details furnished by manufacturers. Criticism will be welcomed.

There are bound to be differences of opinion on several points. For instance, some would place the up-keep, wear and tear of a steam tractor as high as £5 a month, instead of £2. This must depend largely on whether the plant is well cared for or not. Others would prefer to charge depreciation at 20 per cent. instead of 15, and on strictly business principles this would be safer. But actually the life of a well-built steam engine, properly looked after, should be very much more than five years. Although we have charged depreciation on cattle at a higher rate than on the steam plant, it is fair to point out that oxen are often saleable to the butcher, if they are fattened up after being taken from plough work, whereas an engine, when finished, goes to the scrap-heap.

Again, although we have charged nothing for the time of the farmer working the tractor, there is little doubt that he would be more profitably engaged organising and directing the work of his farm. On the other hand, if an expensive engine driver is employed, working costs will go up, and it will be essential to find him full and profitable work for the entire twelve months.

Report of Results of Experiments

AT THE GOVERNMENT FARM, LONGILA, MATABELELAND—SEASON 1914-15.

By John Muirhead.

The intention of the Government experiment farm at Longila, near Lochard, is primarily to ascertain the best methods of farming on the granite soils which cover so large a portion of Matabeleland. To this end, a typical piece of land was chosen, of very moderate fertility, high lying, exposed to the intense seasonal drought, and to severe cold in winter, yet, as last season shews, also subject to heavy rain, which renders the ground a quagmire, impossible of cultivation.

Farming has not yet been intensively attempted on this class of country, although of late years it has been more largely taken up than previously, and, in spite of its apparent inferiority, there can be no question but that this thin granite veld possesses good possibilities, and that, worked in the right way, good profits are to be made on it, though much has yet to be learnt on the subject.

Without dogmatising, for in certain favourably situated instances the contrary may be true, this region is not well adapted for grain growing, fruit or vegetable culture, or for the production of crops, that is, for direct sale; but, on the other hand, the pasture being light, and for the most part sour, there is special need of and advantage in producing crops for stock feed to supplement the winter pasture and veld hay. That this can be profitably done has already been abundantly shewn on the experiment farm, and the value of several crops for such purposes has been demonstrated, notably Napier's fodder, which has proved really extraordinarily valuable, also dhal, Japanese millet and teff. Unfortunately, the experiment farm being as yet run on very humble lines—feeling the way—

it is not heavily stocked, but the possibilities of silage, hay of various sorts, pigeon peas (dhal) and the remarkable value of Napier's fodder for continual grazing, indicate that much might be done in the way of cattle raising, dairying and with sheep; also, although as yet untested, most probably with pigs and poultry.

The season 1914-15 cannot be described otherwise than a very unfavourable one for experimental work on the granite or sand soils such as that of Longila.

A total of 39.60 inches rain was registered throughout the season, of which 33.45 inches fell during the period 21st November to 19th February. On only sixteen days during that period no rain was registered. Owing to the incessant rains and consequent sodden condition of the ground, most crops, with the possible exception of the first sowings of maize and kaffir corn, were planted with the ground in very unfavourable condition to receive the seed. Weeds came up at an alarming rate, and crops assumed an unhealthy yellowish appearance. Cultivation with mules or oxen was practically out of the question, and at one time it looked as if the season would be an absolute blank. With the cessation of the heavy rains, however, matters improved slightly, but on the whole the returns are very disappointing. Appended are details of certain of the more instructive results gleaned.

NAPIER'S FODDER.

This crop appears to be exceptionally well suited to the sand veld. Even under the very adverse conditions experienced during last season, a plot planted in February, 1914, attained a height of 10 to 12 feet, and gave an estimated return of 6 to 8 tons (green weight) per acre by the middle of March, and by the end of May had made a second growth of fully 2 feet high, which was fed off by stock at that date. The growth has continued right through the dry season, and the plot has been fed off by sheep at intervals of two weeks, when it has usually attained a height of 8 to 10 inches. A plot planted in December, 1914, gave a return of 3 to 4 tons green forage per acre in the middle of March. Sheep have been allowed to run over this plot every day since, and have been able to obtain a considerable amount of succulent green feed throughout the dry season.

DHAL.

A plot in its second year gave a return of only 200 lbs. of seed per acre, and a plot planted in December, 1914, gave an almost like result, viz., 203 lbs. per acre. These yields, however, cannot be taken as representing an average, for the crop was badly frosted in the end of July when just coming into full pod, and consequently the grain was badly shrivelled. Prior to the frost the crop shewed every indication of yielding an excellent return. In planting this crop, low-lying or moist situations which are liable to frost should be avoided.

Planting here has been done by the mealie planter in rows 3 feet 6 inches apart, plants thinned out when about 6 inches to 8 inches high to stand 15 inches to 18 inches apart, and the crop cultivated once by horse hoe and once by hand. The crop is easily reaped by cutting the bearing shoots with sickles or bill hooks. These branches are thrown on a bucksail or prepared floor, where they are allowed to lie for a few days until thoroughly dry. The pods then begin to burst open, and the peas can be easily threshed out with sticks, or by beating the branches on the ground. The product is then cleaned in a hand winnower.

JAPANESE MILLET.

From a plot sown on 4th January an excellent stand was obtained, and the crop for hay was estimated at two tons per acre. The grass was allowed to ripen for seed, when a yield of 196 lbs. dressed seed per acre was obtained. This, however, does not represent the full yield, as, owing to the unsettled weather at time of reaping, a great deal of seed was lost in handling, and birds also took their toll.

KAFFIR CORN.

Plots of Common and Sapling kaffir corn planted on 28th and 30th November suffered severely from the excessive rains, and were almost washed out of the ground just after germinating. Ruts formed down every mark of the seed drill, and at one time it looked as if no crop would be reaped. Later the growth improved, and a light crop was reaped, viz., Common 280 lbs. per acre, and Sapling 30 lbs. The Sapling appeared to suffer much more from the excessive wet than the Common variety, and this to a certain extent may explain the difference in yield. Plots of White Milo, Feterita and Red Texas planted on 18th December were put in with the ground in very unfavourable condition, and the resulting germination was rather uneven. Red Texas gave a yield of 207 lbs. per acre, and Feterita 220 lbs. per acre. White Milo, which is apparently a later variety, was totally destroyed by birds and vermin, otherwise the plot was very promising. The above yields cannot be taken as a fair criterion of what any of the above-mentioned varieties would give in an average season, as the past season and the conditions under which the crops were grown were altogether abnormal. Owing to previous lack of growth, all these varieties of kaffir corn have persisted through the winter, and will be left to ripen a crop the second season in place of the first.

YELLOW CROSS WHEAT.

A plot sown broadcast on 23rd January resulted in a fairly good germination, and promised well up to a certain point. Practically no rust was noticeable, but the yield was very disappointing, only 150 lbs. of grain per acre being reaped. A great deal of damage was done by vermin as well as rain, otherwise a much higher yield would have been obtained. This crop was manured at the rate of 5 tons kraal manure per acre.

SIXTY-DAY OATS.

Sown broadcast on 23rd January, and resulted in an excellent germination. Very little rust was noticeable, and a crop of 2,067 lbs. forage per acre was obtained.

Other crops grown included ground-nuts, cow-peas, sunflower, velvet beans, German millet, Japanese buckwheat, sweet potatoes, potatoes, early rye, teff grass and the maize varieties Hickory King, Iowa Silver Mine and Chester County Mammoth. Although all of the above have given moderate results in past seasons, we cannot class them otherwise than commercial failures in the altogether abnormal season under review.

Tobacco Notes.

The following extracts from the Annual Report of the Nyasaland Department of Agriculture for the year ending 31st March, 1915, are instructive and should be of interest to Rhodesian planters:—

"The present crop" (of tobacco) "is not curing up to anticipated results, and I am forced to the conclusion that this is largely due to the diminishing supplies of essential plant foods in many of the gardens which have been too long under tobacco, and the tendency of many growers to plant an acreage in excess of that justified by their barn accommodation and labour supply.

"The present system of growing tobacco continuously on the same soil is suicidal to the future welfare of our tobacco industry, which we have every reason to be proud of, and the difficulty experienced during the present year in disposing of a portion of the crop may be largely attributed to low quality, through neglecting the fertility of our tobacco fields.

"Recent investigations in London pointed to the fact that tobacco suffered considerably through delay in transit and exposure to the sun, frequently arriving in too brittle a condition to handle.

"The yield per acre in Nyasaland is disappointing, as compared with the United States, where anything under 600 lbs. would be called a poor crop, and there is ample scope for the use of fertilisers."

Note.—The average export per acre of cured tobacco from Nyasaland, taken over the last six years, is 409 lbs. per acre.

Correspondence.

THE "ALMERIA" GRAPE.

To the Editor,
Rhodesia Agricultural Journal.

Sir,

Nature teaches three lessons regarding fruit culture in Rhodesia. First, it is essentially a fruit growing country; its wild fruits are numerous and grow luxuriantly, are pleasant to the taste, and would no doubt improve by cultivation, and to judge by their fattening qualities on animals, wild and domestic, they must be very nutritious. The second is that they ripen before the rainy season. The third, or the morale, is that, if you cannot produce fruits before the rainy season, produce them after it. I know of no variety of grape that ripens earlier than December in South Africa, but there are several varieties that ripen late—especially on late sites, *e.g.*, in the Upper Hex River Valley, Worcester, C.P.—the "Hanepoot" is at its best in April or May.

The "Almeria" grape is said to ripen last of all, that is after the rainy season. Any fruit will be welcome at that time, when fruit generally is scarce, and to invalids who have undergone the trying period of summer and its accompanying malaria and quinine. The berries of the white variety are a golden yellow and sweet, and quite suitable for the table. Also, to quote Dr. Perold, "Once our own demands are met, we still have the world's market whither we can export our surplus."

Yours, etc.,

G. J. M. MELLE, M.B.

Overdale,
Arcturus,
26th October, 1915.

Departmental Correspondence.

Under this heading we publish correspondence between farmers and the technical officers attached to the Department of Agriculture, containing information which may be of interest and assistance to our readers.

BATS' GUANO.

The Assistant Agricultural Chemist: Since my previous letter, I have been supplied with details of the composition of the bats' guano which has been offered to you at £5 per ton at Salisbury. The figures for analysis are:—

Nitrogen	3.5	per cent.
Potash (K_2O)	0.64	,,
Total phosphoric oxide	7.08	,,
Lime	14.51	,,

During the season 1911-12 experiments were conducted at the Government Farm, Gwebi, with a view to determining the fertilising value of bats' guano, which had the following composition:—

Nitrogen	5.28	per cent.
Potash	0.92	,,
Phosphoric oxide	4.23	,,

The above bats' guano used in the trial was applied at the rate of 200 lbs. per acre, and it increased the yield by 2¼ bags per acre. Compared with the price of fertilisers then in use in Rhodesia, the material was valued at £5 5s. per ton in Salisbury. Taking this valuation, the net profit per acre on the bats' guano plot worked out at 8s. This is based on the value of the increase of maize at 8s. per bag on the farm, and the estimated cost of the bats' guano at 11s. per acre.

It is not possible to predict with certainty whether your lands will respond profitably to an application of bats' guano, but it seems reasonable to expect favourable results, in view of the fact that your soil (red) is similar to that at Gwebi, on which the experiments were conducted.

POULTRY.

Victoria Correspondent: I have chicks of three and four weeks which are shewing a number of ugly warts or sores around the mouth and eyes. Then, too, some young fowls seem to have sore throats and colds. They stand about sneezing, making a queer noise in the throat, and they look shrivelled up and thin. Will you kindly give me advice and tell me what to do?

Reply by Poultry Adviser: The chicks are undoubtedly suffering from chicken pox, caused perhaps through lack of green food, and their food in general being of too heating a nature; this is very common in hot climates, but very rare in England. *Cure*: All the affected birds must be isolated, as the disease is highly contagious. The spots or warts should be well washed with a strong solution of warm permanganate of potash, and when ripe should be removed, and the diseased skin dressed daily with carbolised vaseline. Care must be taken not to remove the spots before they are ready, as excessive bleeding may result. The spots when removed must be burnt, also any sponge or cloths which have been used in dressing. All the spots must be removed before they fall off of their own accord, as there is a chance if this happens of other birds picking them up. Give small doses of powdered sulphur in the food and a good supply of fresh green food daily. See that the chicks are warm enough at night, as the sulphur tends to open the pores of the skin, and if not warm they are liable to contract chills. A few grains of permanganate of potash should be placed in the drinking water, and when they are practically better, an iron tonic, such as Douglas mixture, should be given.

The young birds with rattling in the throat have colds, perhaps caused through their sleeping quarters being too warm, or perhaps draughty; they should be suitably housed, the nostrils thoroughly cleansed by being held for a moment in a strong solution of warm permanganate of potash; a dose of glycerine should be given at night and half a menthol and eucalyptus lozenge if possible next morning. The nostrils should be greased with eucalyptus and vaseline mixed, and a small quantity of eucalyptus should be placed in the drinking vessel. Finely chopped onions in the food will assist the cure. Two grains of quinine, night and morning, is a good cure, if the birds are taken in time, but if the cold is well established, it is little use. As the birds are shrivelled up and thin, it is just possible they are suffering from tuberculosis, but with no knowledge of the history of the birds or their housing, it is impossible to say.

CITRUS CULTURE.

Victoria Correspondent: I would be much obliged if you could give me some information as to the growing of orange trees. Morgenster seems to be an ideal place for growing oranges. The few trees we have do splendidly, so that I am wanting to go in for oranges on a large scale.

1. I have about 30 navel oranges from Pickstone, a year or two old. Am I safe in budding them on to lemon stock, so as to increase the number of trees? I am rather afraid of imported citrus trees. At two places I tasted fruit from imported naartje trees, and found them most insipid; and now I hear there are other cases of navel oranges proving to be tasteless or nearly so.

2. Some of my young budded oranges have died lately. The reason is probably scale, of which they are full. Please tell me how to treat for scale.

3. In your article on citrus growing, I noticed that irrigation is strongly recommended. Could you tell me at what seasons watering is necessary?

4. When stock is too young to be budded, can one graft, as in the case of deciduous fruits, by cutting to the ground, cleaving and putting in the graft?

5. Finally, I should be glad to know what the prospects for orange growing in the future are. What do you consider to be the requisite number of trees for one to do one's own packing in case of exporting?

Citrus Expert in Reply: (1) Your Washington Navel orange trees are from a good strain, and it should be safe to propagate from these, provided they have grown out well. At the same time, it is not sound policy to propagate from young trees; budwood should be taken from older trees that have been specially noted individually for performing their duty, every season over a period of several years, in producing good fruit true to type; and not from trees that bear indifferent crops, as in doing so there is a likely chance of your perpetuating the poor bearing quality of the parent tree. On the other hand, if you propagate from selected trees that have performed good crop records for some years, the resulting trees will, in all probability, be producers of similar quality crops.

With regard to your distrust of imported trees of Washington Navels, it has been the experience everywhere that this variety worked on lemon stock is coarse and wanting in flavour for the first year or so, but this lack of quality disappears, and improvement takes place even after one good heavy cropping, always provided, of course, that the trees are properly treated. If budded on sweet seedling orange stock, the fruit is perhaps of better quality on the young trees, but as you possibly know, the rough lemon is almost entirely used as a stock, on acount of it being more resistant against collar rot than the sweet orange stock.

(2) You do not describe the "scale" that is troubling your trees. Soft brown and red scale are the two commonest in this Territory, both of which are quite easy to keep under control, if effectually treated. I enclose herewith a formula for preparing "Resin Wash," which should be sprayed on the trees, in as fine a smoky mist as possible, at intervals of ten or twelve days, until the pest is eradicated. Repeat this treatment at every re-appearance of the pest.

(3) In the article to which you refer, I go further than strongly recommending irrigation for commercial citrus plantings, and I repeat here that it is not a business proposition to lay out a citrus orchard without first making sure of an adequate supply of water, and then planting according to the amount of water available.

Regarding the season when irrigation is necessary, I would say that it might be necessary to irrigate orange trees in Southern Rhodesia at any time of the year. It is safe to say there are practically seven dry months in the year, viz., April to November. It frequently occurs that during the so-called wet season there may be no appreciable rainfall for some weeks, while the sun is extremely hot, so that your orange trees laden with growing fruit begin to shew signs of distress in the way of leaves wilting and fruit beginning to drop. Now, this should never occur if your orange trees are to be fully profitable, and would not happen if your irrigation scheme were a sound one; so that it amounts to this, that you should never allow your trees to shew the want of water at any time of the year; but, on the other hand, to have the land soggy where your orange trees stand for any length of time is just as fatal as the reverse. I would add, however, that an irrigation half done is almost worse than none at all; therefore, when irrigating, your object should be to get the water as deeply as possible into the ground so as to attract the roots to forage deep down. Irrigation should be followed by cultivation as soon as the land is fit to work, and repeated, say, every ten days, so as to keep the moisture down below as long as possible. Continuous shallow irrigation is harmful in many ways; it is liable to form a hard pan in some soils, which is practically impervious to water, and through which orange roots will not penetrate. Now this state of things forces the root system to remain near the surface, so that in the event of a drought occurring and anything going wrong with your irrigation scheme, to prevent getting water on to the land, you would probably suffer a severe loss, and your trees receive such a shock that they might feel for a year or so, whereas trees that are always thoroughly and *deeply* irrigated stand a better chance of tiding over a drought, supposing a failure should occur in the water supply.

(4) No; grafting is never advisable with citrus. Lemon stock that has attained, say, 18 inches in height and one-third inch in diameter is quite fit to bud.

(5) The prospects for orange growing in this Territory in the right situation, provided it is tackled as a business proposition, are excellent. It has been demonstrated, I think, that an export trade in oranges is possible where due precautions, such as are taken in other fruit-growing countries, are followed, in the way of growing the class of fruit desired in certain markets, grading and packing with utmost care and attention to detail, so that the package and its contents arrive at the place of sale in the best possible condition. The trade in high quality oranges is practically unlimited, and capable of vast expansion, both in Europe and America. We can grow early and mid-season varieties, which arrive in those countries during their summer months at a time when those markets are bare of this class of fruit; and, further, some late sorts can be grown which reach those markets ripe and sweet in favourable competition against the somewhat unripe specimens from their usual sources of winter supply.

With regard to the minimum acreage to plant, with a view to erecting your own packing house and necessary machinery where you would do your own grading and packing for export, I think it would be safe to put this at 20 acres. This would give you approximately 1,500 trees, from which you might anticipate a net return of 5s. per tree in the fourth year from planting in orchard, gradually increasing up to 20s. per tree in the tenth year, which figure, with continued proper treatment, you should be able to expect as an annual return for many years. I would add that this is a very low estimate compared with experiences in recent years. In the event of there being a number of growers in fairly close proximity to each other, sufficient to warrant the working of a co-operative packing house, it would not matter how small your orchard was.

The Agricultural Outlook.

The summer season is opening well with every promise of a generous rainfall and generally favourable farming conditions. Throughout the country the practice of laying by supplies of winter feed for stock is growing steadily, so that it is now common to find farms provided with stacks of maize stalks and silo pits, in addition to the usual veld hay. At the same time there has been a marked increase in the number of storage dams built and wells and boreholes sunk for the watering of stock. The result is that, with few exceptions, stock have wintered well, losses from poverty have been at a minimum, and the mortality in calves very low. Consequently flocks and herds are in wonderfully fine condition for the time of the year, and stock-owners can look forward to the coming season with a sense of security and confidence beyond the ordinary. The few cases in which stock are reported as below par are in districts where the pastures were severely depleted by frosts and grass fires. With the exception of parts where African Coast Fever exists, cattle as a whole have been unusually free from disease. Although in some districts there were considerable losses amongst small stock at the end of last rains, the flocks are now looking well. If owners continue to take precautions against drought and shortage of food, as this year, and their example is generally followed, then the outlook for stock-breeding may be said to be very hopeful. The next desideratum is the opening of larger markets for the product of the herds.

Winter crops, both under irrigation and in moist bottom lands, have been good. Excellent yields of potatoes have been reaped and are still being taken up. Early maize, in the districts favoured with suitable lands, is well forward and looking well. At the time of going to press, little has yet been done in sowing of summer crops, although in some parts maize planting has commenced. The acreage under maize shews steady increase. Ploughing is well ahead, and, if the rainy season fulfils its promise, a large yield of maize and other summer crops may be anticipated. Tobacco is being planted in limited quantity. The area under citrus orchards is being added to considerably.

Veterinary Report.

September, 1915.

AFRICAN COAST FEVER.

SALISBURY DISTRICT.—A fresh outbreak occurred on the farm Greystone, adjoining Borrowdale; one animal only affected. As all cattle on this farm have been regularly dipped for some months, a heavy mortality is not anticipated. At existing centres of infection the mortality was as follows:—Borrowdale, 1 head; Luna, 2.

MAZOE DISTRICT.—Two cases occurred on the previously infected area, Belford Estate, and the remainder of the herd was slaughtered.

UMTALI DISTRICT.—In the Penhalonga Valley no fresh cases occurred during the month.

MELSETTER DISTRICT.—Fresh outbreaks occurred on the farms Kenilworth, Cecilton, Penkridge and Woodstock. In two of these, viz., Kenilworth and Woodstock, portions of the farms had already been infected, and the appearance of the disease amongst the hitherto clean herds was not unexpected. At the previously infected farm Houtberg, a recrudescence occurred after four months' freedom from disease. When the disease first appeared on this farm in May last, the herd was temperatured and placed on clean veld with a small loss. The re-appearance of the disease is undoubtedly due to some of the cattle having been allowed to stray back to the infected veld. The farm Penkridge is on the southern border of the Umtali district, and as it adjoins the grossly infected farm Quagga's Hoek, in the Melsetter district, it will be more convenient to regard it as in the Melsetter area. This outbreak is the result of the removal of some oxen from Quagga's Hoek prior to the discovery of disease there. The animals concerned have been moved back to Quagga's Hoek. The movement referred to is being enquired into.

The mortality during the month was as follows:—Randfontein, 13 head; Wolvedraai, 30; Landsdown, 2; Houtberg, 2; Highlands, 4; Joppa, 4; Kenilworth, 3; Rockwood, 5; Roslyn, 2; Quagga's Hoek, 17; Cecilton, 2; Woodstock, 4; Penkridge, 1.

GLANDERS.

The following animals were tested with mallein on importation and found healthy:—Bulawayo, Gwanda and Plumtree: Horses, 22; mules, 3; donkeys, 129. Umtali: Horses, 9. Salisbury: Mules, 61. Gwelo: Horses, 5.

TUBERCULIN TEST.

Six bulls and five heifers from the United Kingdom were tested, with negative results.

IMPORTATIONS.

In addition to the above, the following animals were imported:—Heifers, *ex* Union, 109; bulls, *ex* Union, 31; sheep and goats, *ex* Union, 2,682.

GENERAL.

A slight mortality from poverty was reported from several districts, particularly Inyanga, where the weather was the coldest experienced for many years. On the whole, however, cattle have done remarkably well during the past winter season.

October, 1915.

AFRICAN COAST FEVER.

Salisbury District.—No fresh outbreaks. The following mortality occurred at existing centres of infection:—Borrowdale, 38 head; Carrickcreagh, 21; Glen Lorne, 1; Sternblick, 1. Arrangements have been made for the disposal of the majority of the Borrowdale cattle by slaughter.

Mazoe District.—A fresh outbreak occurred in a herd at Mazoe, the result of infection dropped by the Belford Estate cattle in travelling to the Mazoe dipping tank prior to the discovery of Coast Fever infection amongst them. Only one beast became infected and was destroyed.

Umtali District.—The Penhalonga cattle remain healthy.

Melsetter District. — A fresh outbreak occurred amongst a small herd of cattle on the farm Groenvlei, which adjoins the infected farms Clearwater and Kenilworth. The herd was moved through a temperature camp to clean veld.

The following mortality occurred during the month:—Randfontein, 1 head; Inhoek, 1; Wolvedraai, 5; Landsdown, 3; Houtberg, 21; Highlands, 2; Joppa, 7; Rockwood, 12; Roslyn, 2; Quagga's Hoek, 9; Cecilton, 10; Woodstock, 2; Penkridge, 1; Groenvlei, 1.

GLANDERS.

The following animals were tested with mallein on importation and found healthy:—Bulawayo, Plumtree and Gwanda: Horses, 31; mules, 23; donkeys, 87.

TUBERCULIN TEST.

Seven bulls and eight heifers from the United Kingdom were tested, with negative results.

IMPORTATIONS.

In addition to the above, the following animals were imported:—Heifers, *ex* Union, 130; bulls, *ex* Union, 46; sheep and goats, *ex* Union, 2,841; pigs, *ex* Union, 9.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Remember

"That your neighbours are good people.

"That good neighbours are the result of good neighbours.

"That no community can rise higher than the average level of all its people.

"That discussion, publicity and education will raise the average level of any community.

"That the strongest community in the State is the best organised one.

"That the farmers' club represents a powerful unit for organising rural communities for social and economic service."—*Minnesota Farmers' Library.*

Weeds.

"The biggest waste in agriculture is caused by weeds, and a regular campaign should be waged against such wasters. Weeds and waste have been receiving attention lately in Canada and the United States, and Professor Howitt asserts that, at a conservative estimate, weeds cost the farmers of Ontario £2,600,000 a year. The experts of the U.S. Department of Agriculture claim that every year weeds cause a loss throughout the United States of £40,000,000."—*Implement and Machinery Review.*

Farming Calendar.

December.

BEE-KEEPING.

Honey in good quantities will still be coming in, as the welcome rains will be beneficial to veld blooms. Continue to give room by extracting honey from shallow frames, then return these to be refilled. Extracted honey should be drawn from the machine into the honey ripener, into which it should be strained through several thicknesses of butter muslin, remaining there, to allow surplus water to evaporate, for five days, then draw off from the tap into clear white glass bottles. All bottles must be cleansed thoroughly. See that ventilation is ample on hot days.

CITRUS FRUITS.

Citrus trees can be planted out at any time between October and the end of January. The best time is the end of October or early November, when the ground is warm and trees have hardened up their first growth of season, *i.e.*, spring growth, and are in fit condition to commence second growth, which they will do if transplanted properly at that time—end of October. Citrus trees should not be planted later than the end of January, as the growth they put on after planting later than this is very liable to be still sappy at the approach of winter, and consequently more sensible to the effect of cold. The young trees require to be well watered after planting. The soil around them should never be allowed to be really dry, but, on the other hand, it must not be kept in a state of sogginess. Immediately after planting protect the stems of the young trees from the sun by whitewashing or covering up with grass. Cut the tree down so as to leave a stem of about 2ft. 6ins. or 3ft. long, and form the head of the future tree in the top 8ins. or 1ft., according to the best position of the shoots, not more than three or four in number. All other growths to be suppressed whenever they appear. Keep the soil nice and loose by digging, forking or hoeing round the young trees. It will then not be necessary to water them so frequently. The orchard should by this time have been thoroughly ploughed, and any cover crop sown already be up and growing. Don't forget, before the wet season, the first ploughing should be up and down the steepest gradient of the orchard, and be followed immediately after harrowing by cross-ploughing across the hill. This is to obviate as much as possible erosion of the soil during the coming heavy rains. Remember that, if a long spell of dry weather occurs during the so-called wet season, your bearing orange trees will probably require an application of water, otherwise the crop of fruit may receive a check from which it will never properly recover.

CROPS.

This is the month when most of the summer farm crops should be sown. If rains have been early, it is sometimes usual to start planting in the latter half of November. There is, however, less risk attached to December plantings, and as there is no danger of early frosts to interfere with the ripening of the plants, it is best not to start planting too early in the season.

Maize planting should be continued this month. Other circumstances permitting, an effort should be made to have the planting completed by the middle of the month. Light harrowing immediately before and shortly after planting will be of great assistance in securing uniform germination and in keeping down weeds, thus giving the young maize plant a good start.

Sunflower, dhal and peanuts should be sown as early as possible, also velvet beans for seed, as these crops require a full season to attain maturity. Wheat and oats may be sown as summer crops during the whole of this month. Other crops, such as teff grass, linseed, millet, buckwheat, majorda melons, and mangels may be sown at any time during the month. The main crop of potatoes should be put in from the middle of the month onwards.

ENTOMOLOGICAL.

Maize.—Surface beetles may be very injurious if seed is planted in dry soil during December. See "The Dusty Surface Beetle," *Agricultural Journal*, August, 1914. Cutworms and stalk borer are likely to be in evidence. See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912.

Tobacco.—The newly planted crop is subject to the attack of surface beetles, stem borer, leaf miner, "wireworms," grasshoppers, large crickets, etc. A good deal of protection may be obtained by dipping the tops of the transplants as far as the roots in arsenate of lead 1lb.—15 galls. water. See "Handbook of Tobacco Culture," published by the Agricultural Department, pp. 71-90.

Potato.—Ladybirds may be injurious to the foliage. See "Two Ladybirds injurious to Potato Plants," *Agricultural Journal*, October, 1913. On sandy soils blue blister beetles may be troublesome. An immediate spraying with arsenate of lead 1lb.—12 galls. water should give relief.

Cabbage, Turnip, etc.—Webworm and diamond back moth are still the main pests. See "Cabbage Webworm," *Agricultural Journal*, February, 1914. Dusting with paris green and lime will give protection against both pests.

Bean.—Stem maggot may be serious in December, especially if previous crops have been grown for French beans in gardens. See "Bean Stem Maggot," *Agricultural Journal*, April, 1913.

Melon, Marrow, etc.—Leaf-eating beetles frequently destroy the very small plants entirely. Spray with an arsenical wash or cover the young plants.

Deciduous Trees.—Chafer beetles and fruit beetles are commonly very troublesome. See "Chafer Beetles," *Agricultural Journal*, December, 1914.

Fig.—Collect and destroy all fruit infested with fig weevil.

FLOWER GARDEN.

This month is generally showery, and constant stirring of the soil is, therefore, necessary to keep it loose. Seeds of perennials and annuals for February blooms may be sown. Transplanting should be done in the evening on a cloudy day. Carnations should be kept free from dead wood, and climbers attended to.

FORESTRY.

Give the ground the final harrowing, and if the season is a normal one, planting out should commence. This is the ideal month for planting out in a normal season, as the young trees have the benefit of all the summer rains, and become well established before the dry winter months arrive. Plant on dull, rainy days, or failing such days, late in the afternoons.

POULTRY.

Thoroughly clean and overhaul all brooders, coops and chick houses not in use, and store away ready for next season. Do not continue hatching from moulting birds. If possible, pen up separately all the breeding cockerels. Remove the birds from all breeding pens and small runs. Dig over the ground and plant a crop. Dispose of all surplus cocks and old hens.

STOCK.

Cattle.—The veld everywhere is now good, and little trouble in respect of grazing is likely to be experienced. Ranching cattle will require little attention beyond dipping, but any stock that are in poor condition should be kept near home and given a ration of hay and possibly mealies daily. The bulls should be returned to the herd, either at the end of the month or in January, and it should be remembered that the better they are conditioned and fitted for their work the more hope there is of a good crop of calves. For this reason also, every effort should be made to have all female breeding stock in good condition. The dairyman will find that a ration of mealies and hay, and oil cake, if he can afford it, will repay him in spite of the fact that grass is plentiful. The oil cake will be found especially valuable where the production of cream or butter is the object in view. Milch cows should be protected as much as possible from cold rains and hot sun. A lean-to shed, well bedded up, will increase the milk supply, especially in periods of protracted rainfall. The calf pen should be kept clean, dry and sweet, and calves should be kept in in hot or very wet weather. Dip regularly.

Sheep.—Graze on higher lying lands, keep the kraals clean, dry and airy, and watch for ticks.

TOBACCO.

Continue transplanting and cultivating that which has been transplanted. Harrow and cultivate the fields that are to be planted out and have had rain since the last cultivation, so as to have them loose and light for the reception of the plants. Never neglect the tobacco that has been set out to transplant—rather encourage it in every way by cultivation and early fertilisation to grow and come to maturity in 90 to 100 days after transplanting.

VEGETABLE GARDEN.

All vegetable seeds may be planted. All advanced plants should be constantly cultivated. Potatoes should be ridged, and peas, beans and tomatoes staked. This is a good month for planting the main crop of potatoes.

VETERINARY.

Occasional cases of horse-sickness may occur during this month. With the great increase in ticks, due to the heat and moisture, cases of redwater and gallsickness may be expected, more especially amongst Colonial stock imported since the last rainy season. The cool weather which frequently follows the early rains is an excellent time for castrating calves and other animals.

WEATHER.

In Mashonaland usually six inches of rain fall this month, and in Matabeleland five inches, but considerable variations occur. Less rain usually falls at this time in extreme southern parts of the country. Very heavy downpours may be looked for, and it is well to be provided by drains and ditches against the effects of heavy rain storms. A dry spell about Christmas time is a very frequent, though not invariable, event in Rhodesia. This partial drought may last only a fortnight or may extend to six weeks; in the latter event often causing some anxiety regarding young crops, especially those not yet through the ground. The best means of meeting this condition of the weather is by frequent surface cultivation by harrow or horse hoe, to preserve a loose soil mulch on the surface and prevent losses of soil moisture by evaporation.

January.

BEE-KEEPING.

Where it is desirous, artificial swarms can now be made, so also can nuclei be formed from proved best working strains. All the above must be stimulated with food. In the cooler districts it will be necessary to contract the entrances and close down for winter.

CITRUS FRUITS.

See under December notes.

CROPS.

Sowings of wheat may be continued up to the middle of this month, and teff grass and buckwheat may be sown up to the end of the month. Planting of main crop of potatoes may be continued, according to the moisture in the soil, up to the end of the month.

ENTOMOLOGICAL.

Maize.—This crop is subject to the attack of stalk borer, black chafer beetle (*Heteronychus*) and white grubs during this month. Information concerning most of these pests may be obtained by reference to "Insect Pests of Maize" in the issue of the *Journal* for June, 1912. Seed planted during this month is liable to suffer from surface beetles. See "The Dusty Surface Beetle," *Agricultural Journal*, August, 1914.

Tobacco.—Most of the pests of this crop are active during January, *e.g.*, stem borer, leaf miner, "wireworms," surface beetles, large crickets, grasshoppers. Tobacco pests are discussed on pp. 71-90 of the "Handbook of Tobacco Culture," published by the Department of Agriculture.

Potato.—Certain ladybirds are apt to defoliate the young potato plants of the main crop, especially on farms where early potatoes are also grown. See *Agricultural Journal*, October, 1913. Blue blister beetles are apt to be injurious on sandy soils, and may be checked by spraying with arsenate of lead 1 lb. to 12 gallons of water. Spraying should be commenced for early blight. See *Agricultural Journal*, August, 1913.

Cabbage Family.—Plants of this family are subject to the attacks of webworm and sawfly in January. See *Agricultural Journal*, February, 1914; April, 1910; April, 1911.

Beans and Cowpeas.—These suffer chiefly from stem maggot. See *Agricultural Journal*, April, 1913. Aphis may be checked by spraying with tobacco wash or paraffin emulsion.

Melon Family.—The chief pests in January are leaf-eating beetles. Spray with an arsenical wash or cover young plants.

Citrus Trees.—The fruit is subject to the attack of citrus codling. Collect and destroy the infested fruit.

Deciduous Fruits.—These are all subject to the attack of fruit-eating beetles. See "Chafer Beetles," *Agricultural Journal*, December, 1914. Fruit moths are injurious during this month, the only preventive measure being to net the trees. For fruit fly remedies, see *Agricultural Journal*, August, 1911.

Fig.—The adult beetles of the fig borer are to be found on the young shoots. They should be destroyed. The grubs in the stems may be killed with a little carbon di-sulphide.

FLOWER GARDEN.

This month requires all one's energy in the flower garden. Annuals may still be sown for late flowering before the season is over. Planting out should be done as early as the weather permits, and advantage taken of a dull day after a shower for this work. If care be exercised much smaller plants may be put out than would at first be thought advisable, as with attention these will make stronger plants than larger ones, which are more likely to receive a check. The soil requires constant stirring, owing to the packing caused by the rains and for the eradication of weeds, which are now very troublesome. All plants should be kept free of dead and decaying matter.

FORESTRY.

If the rains are seasonable, plant out evergreen trees, such as gums, cypress, pines, etc. Fill in all blanks as soon as they are noticed, and do not leave them until the following season. Planting should be done on a wet day, or failing that, on a dull day, or late in the afternoons.

POULTRY.

Provide the pullets with proper houses if eggs are wanted. Moulting birds must be housed in good dry houses if they are to moult out satisfactorily and come on to lay again as soon as possible. Do not miss the evening feed because it is raining. It is better to feed at two or three o'clock, if the weather looks threatening, than not at all. Read notes on treatment of moulting birds in the *Agricultural Journal* of February last.

STOCK.

Cattle.—The recommendations for December apply equally to this month. Ranchers will return the bulls to the herd some time this month, with a view to having the calving season commence in the latter part of September or October.

Sheep.—Continue as recommended for December. If heavy rains have been experienced, a few mealies to the ewes will keep them in condition and will often prevent much trouble arising from poverty and anæmia. Those who favour autumn lambs should remember that it will be necessary to put the ram with the flock again in February, and should make arrangements in time. In this connection, a little extra feed, as recommended above, will help to fit the ewes for mating, and will often bring the flock into season more or less together, and will then avoid a prolonged lambing season.

TOBACCO.

Cultivation should continue, and all small and weak-looking plants should have special attention, so as to bring them to maturity with the rest of the field. In most districts in Rhodesia the early planted tobacco is the best; if there has been sufficient rain to allow of the whole crop being transplanted by the end of December or 15th of January, so much the better, and unless the rain is very late, in which case we look for a late season, it is better to stop after the 15th of January, even though the full crop has not been set out. The flue barns should be looked after, and got in readiness for the curing season.

VEGETABLE GARDEN.

Turnips, carrots, cabbage, lettuce, etc., may be sown for carrying on during the winter months. Potatoes may be planted this month for keeping through the winter. Weeding and cultivating between the rows should be continually carried on.

VETERINARY.

Horse-sickness may now be expected, especially in districts where early heavy rains have occurred. Blue tongue in sheep will also be prevalent.

WEATHER.

Heavy rain is to be looked for, and during this month we may normally expect nine to twelve inches on the eastern border, seven-and-a-half in the north, and less as one travels westwards or southwards. At this time of year the rainfall tends to be heavier in the eastern than in the western portions of the Territory, whilst prolonged steady rains take the place of the thunder showers which marked the earlier part of the wet season. The growing period is at its height, and high temperatures are registered.

Market Reports.

There has been no great activity on the stock markets, though successful sales have been held in Bulawayo and Gwelo. The price of slaughter beasts has hardened since last report. Maize shews a little higher price, and rapoko, as usual at this season, is in demand. Crops now coming in, such as potatoes and onions, are naturally at easier prices.

With the sale held by Mr. A. G. Hay in Bulawayo on 17th November, the periodic cattle sales in that district are renewed, and, it is hoped, will be carried on regularly. The following prices were obtained for various classes:—Prime slaughter, from £11 to £18 7s. 6d.; medium slaughter, £6 5s. to £10 12s. 6d.; compound oxen, £3 2s. 6d. to £5 5s.; trek oxen, £8 to £9 2s. 6d.; Red Poll heifers, £11 to £12; local-bred heifers, £6 17s. 6d. to £7; Africander heifers, £7 5s.; milch cows, £15 15s. to £16 10s.; native breeding stock, £4 2s. 6d. to £6 7s. 6d.; sheep and goats, 7s. 6d. to 18s. 6d.; Hereford bulls, £28, £38 and £65; Shorthorn bulls, £14, £18, £28, £35 and £55; bulls, £7 12s. 6d. to £8 10s.; tollies, £3 to £3 7s. 6d.

The sale held in Gwelo on 13th October by Mr. A. E. White was also very successful, and Gwelo is a very convenient centre for these auctions, being accessible from so many other districts. Prices secured was as follows:—Trek oxen in good condition were in strong demand, and prices ranged from £6 10s. to £12 10s. Good slaughter oxen were in demand at about 35s. per 100 lbs. Some of the best slaughter oxen went to Salisbury, and were purchased by Messrs. J. Bloom & Co., who were the largest buyers of slaughter stock at the sale. Tollies ranged from £3 5s. to £5. One lot of 16 nice young cross-bred Friesland-Africander oxen were sold for £7 5s. each. Africander heifers were in good demand and realised from £10 to £15 2s. 6d. One particularly nice lot, bred by Mr. W. Pringle, Bedford, C.C., were purchased by Mr. M. Macaulay, who is farming near Sinoia. A few lots of nice heifers out of Mashona cows by Shorthorn and Sussex bulls realised from £7 to £8 10s., and good strong Mashona cows in calf to above bulls went for £6 to £7 5s.; old Mashona cows, from £3 5s. to £5. Three promising young Africander bulls were sold from £10 to £12. There were several pedigree North Devon, Friesland and Shorthorn bulls, but there was no demand for these. A few good young mare donkeys were sold at £5 10s. each, and Jacks at the same price. No demand for horses or mules. About 200 sheep and goats unsold. Young pigs, 7s. 6d. to 10s.; killing fowls, from 1s 6d. to 2s. each; breeding fowls, 4s. to 5s. each. Attention may be drawn to Mr. White's new sale yards, which are about 1½ miles from the Royal Hotel, and on his own ground, which is divided into paddocks with a good supply of fresh water.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs. -	9/3 12/9	—	—	25/0
Beans, 203 lbs. -	21/0	20/0 22/0	—	25/0 30/0
Boer Meal, unsifted, 200 lbs. - -	—	—	48/0 50/0	50/0
Bran, wheaten, 100 lbs.	6/3	—	11/6 12/6	15/0
Flour, 100 lbs. -	—	—	—	26/0 27/0
,, Colonial, 100 lbs.	—	—	26/6 27/0	27/6 30/0
Forage, 100 lbs. -	3/0 5/6	—	—	8/0
,, Colonial Oat -	—	4/0 4/6	—	—
Hay - -	Bale. 4d. 6d.	—	Ton. 40/0 45/0	35/0 40/0
Kaffir Corn, 200 lbs. -	7/0 8/0	8/0 9/0	11/6 12/6	9/0 10/0
Manna, 100 lbs. -	—	—	—	—
Mealies, S.A. White, 203 lbs. - -	8/7 9/0	8/6 9/0	11/6 12/0	7/6 8/6
Mealies, Yellow, 203 lbs.	—	9/0 9/6	—	—
Mealie Meal, White, 183 lbs. - -	—	—	—	8/0 9/0
Munga, 200 lbs. -	—	—	—	11/0 12/0
Monkey Nuts, bag, 83 lbs.	11/0	11/6	8/9 9/0	7/0 8/0
Oats, 150 lbs. -	10/6 14/0	—	18/6 20/0	25/0 27/6
Onions, 120 lbs. -	8/9 11/9	12/0 14/0	17/6 18/6	16/0 17/0
Peas, 200 lbs. -	25/0 28/0	—	—	—
Potatoes, new, 150 lbs. -	8/0 12/0	7/6 20/0	18/6 22/6	10/0 11/0
,, old, 150 lbs. -	2/6 7/0	—	—	—
Rapoko - -	—	—	—	10/6 11/0
Rye, 200 lbs. - -	16/0	—	—	—
Salt, 200 lbs. - -	4/6	—	—	11/6 12/0
Wheat, 203 lbs. -	27/0	—	—	30/0
Butter, local, per lb. -	1/4 2/0	1/3 1/6	1/6 1/9	2/0
Eggs, local, per dozen -	1/0 1/9	9d. 1/3	1/9 2/0	2/0
Ducks, each - -	3/0 4/0	3/6 4/0	—	4/6 6/0
Fowls, each - -	2/0 3/6	2/0 3/0	—	3/0 4/6
Geese, each - -	4/6 5/0	—	—	9/0 11/0
Turkeys, cocks, each -	11/0 26/0	7/0 12/9	—	—

LIVE STOCK.

Slaughter Cattle, 100 lbs.	37/0 44/0	—	27/6 40/0	40/0 42/6
Trek Oxen, trained -	£4/10 £8/10	—	£6 £10	£8 £10
Local Cows, milk -	—	—	£7 £17/10	—
Dairy Cows - -	—	—	£20 £30	£20 £25
Native Cows - -	—	—	—	£5/10 £7/10
Heifers, Colonial -	£4 £5	—	£7 £17	£7 £8
,, Native -	—	—	—	£4/10 £5
Pigs, live weight -	3¾d. 6¼d.	—	3½d. 4½d.	4d. 4¼d.
Horses, riding, salted -	—	—	—	£35 £40
,, ,, unsalted	£4/10 £25	—	£12 £30	£22 £25
Mules, inoculated -	£7 £23	—	£15 £20	£22 £25
Donkeys, geldings -	£2/10 £5	—	£3/10 £6	£4/10 £6
,, mares -	—	—	£4 £7/10	—
Goats - -	12/6 26/0	—	8/0 18/0	12/6 15/0
Persian Ewes -	—	—	—	20/0
Cross-bred Ewes -	—	—	—	—
Sheep, slaughter -	12/0 25/0	—	15/0 28/0	25/0 27/6

Weather Bureau.

TEMPERATURES.

Station	September		October	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
Mashonaland—				
Hartley—				
Franceys Farm	—	—	—	—
Gatooma	88·0	62·7	93·9	66·0
Giant Mine	—	—	—	—
Hallingbury Farm	85·5	54·6	89·7	59·2
Idaho	84·0	50·9	89·7	55·1
Lomagundi—				
Clydesdale	—	—	—	—
Eldorado Mine	86·4	54·9	89·98	60·77
Kanyemba	96·3	62·6	100·1	69·1
Sinoia	90·6	52·6	93·5	59·1
Sipolilo	84·2	58·1	90·2	62·4
Makoni—				
River Junction Farm	—	—	—	—
Rupurara	71·3	—	75·0	50·9
Mangwendi—				
Kwenda Mission	—	—	78·8	62·0
Mazoe—				
Melfort Farm Estate	—	—	—	—
Shamva Mine	85·27	56·47	88·39	61·09
Melsetter—				
Melsetter	73·5	64·7	—	—
Mount Selinda	—	—	—	—
Vermont	71·6	50·7	82·5	56·9
Salisbury—				
Chishawasha	81·8	50·7	87·11	54·26
Glenara	—	—	—	—
Salisbury (Agric. Dept. Offices)	79·5	51·7	—	—
,, (Gaol)	80·3	53·4	89·3	57·5
Umtali—				
Chiconga's Location	79·4	54·3	86·4	59·6
Summerfield	—	—	—	—
Umtali High School	79·7	54·6	—	—
Victoria—				
Eythorne	76·6	50·9	87·7	56·5
Victoria	78·4	58·6	—	—
Matabeleland—				
Bulawayo—				
Essexvale	81·9	50·9	89·4	57·8
Hope Fountain	—	—	—	—
Leighton	—	—	—	—
Observatory	79·6	53·0	—	—
Rhodes Matopo Park	82·5	54·03	89·0	57·3
Bulalima—				
Plumtree	—	—	89·6	59·8
Tegwani	83·4	56·6	82·8	61·2
Gwanda—				
Antelope Mine	82·23	56·68	89·1	61·0

TEMPERATURES—*(Continued).*

STATION	SEPTEMBER		OCTOBER	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—(Continued)				
Gwelo—				
Hagley (Iron Mine Hill)	77·2	50·6	—	54·3
Gwelo (Gaol)	80·3	—	87·3	56·9
Mangwe—				
Empandeni	85·5	52·1	91·9	58·3
Tuli—				
Mazunga	86·4	54·2	90·8	59·5
Tuli	86·1	36·1	92·2	61·4
Wankie—				
Guyo	—	—	—	—
Victoria Falls	91·8	50·2	95·5	55·4
Wankie (Hospital)	94·9	65·9	100·0	73·4

RAINFALL.

STATION	September	October
MASHONALAND :		
Charter—		
Buhera	1·51	1·47
Driefontein	0·09	0·74
Enkeldoorn	0·47	0·51
Grootfontein	0·55	0·74
Induna Farm	0·16	1·20
Marshbrook	0·19	0·67
Range	0·67	0·59
Riversdale	0·71	0·43
Spitzkop	0·15	0·25
Umvuma (Railway)	0·18	0·77
Wylde Grove	0·17	1·00
Hartley—		
Ardgowan	0·17	0·53
Auchter Leny	0·16	0·01
Battlefields (Railway)	Nil	1·02
Beatrice Mine	—	—
Carnock Farm	0·11	0·44
Clifton Farm	—	—
Elephant Hill, Battlefields	Nil	1·03
Elvington	0·20	0·32
Franceys	—	—
Gadzema (Railway)	0·12	0·40
Gatooma (Railway)	Nil	1·16
Gatooma	0·03	1·16
Giant Mine	—	—
Gowerlands	0·35	0·69
Hallingbury	0·24	0·33
Hartley (Railway)	0·05	0·05
Hartley (Gaol)	—	—
Idaho	0·68	1·45

RAINFALL—*(Continued).*

Station	September	October
MASHONALAND—(Continued)		
Hartley—continued		
"Jenkinstown"	1·45	—
Makwiro	0·31	0·45
M'pofha Farm	—	—
Philiphaugh	0·44	1·10
Shagari	0·20	0·04
"Stoneygate"	0·16	0·63
Lomagundi—		
Argyle	Nil	0·53
Banket Junction (Railway)	,,	0·51
Clydesdale	,,	—
Darwendale	0·15	0·92
Duxbury Farm	0·03	1·17
Eldorado (Railway)	Nil	—
Eldorado Mine	,,	0·50
Golden Kopje Mine	,,	0·41
Kanyemba	,,	0·12
Lone Cow Estate	0·27	0·65
Longmead	0·05	0·66
Nassau Estate	—	0·50
Palm Tree Farm	0·10	1·45
Sinoia	Nil	0·66
Sipolilo	0·58	0·12
Umvukwe Ranche	Nil	1·16
Makoni—		
Chimbi Source	0·34	0·81
Eagle's Nest	0·61	0·49
Ellavale	0·90	0·81
Inyanga	1·24	0·60
Inyazura	—	—
Mona	0·59	0·51
Monte Cassino Mission	0·05	0·65
Odzi (Railway)	0·48	1·38
River Junction	—	—
Rupurara	0·81	1·11
Rusape (Railway)	0·70	0·79
Rusape	0·70	0·79
Springs	0·82	1·40
St. Trias' Hill	1·52	0·80
Sombi Springs	0·37	1·00
Mangwendi—		
Bonongwe...	0·14	0·33
Glen Somerset	0·42	0·47
Huish Estate	0·21	0·19
Kwenda Mission	—	1·22
Land Settlement Farm	0·51	—
Macheke (Railway)	0·18	0·56
Marandellas	—	—
Marandellas (Railway)	0·50	0·69
Mtoko	Nil	Nil
Mrewa	0·35	1·27
Selous Nek	Nil	1·45
Theydon	0·19	0·84
Tweedjan	0·51	0·33

RAINFALL—(*Continued*).

STATION	September	October
MASHONALAND—(Continued)		
Mazoe—		
Avonduur	0·28	0·56
Bindura (Railway)	0·35	0·98
Bindura	1·15	0·68
Ceres	0·70	0·76
Chipoli	Nil	0·33
Claverhill	—	—
Dunmaglas	0·38	—
Fairview	—	—
Jumbo	Nil	Nil
Kilmer	0·34	0·59
Laguaha	0·15	0·70
Lowdale	0·37	0·21
Mazoe	0·05	—
Mazoe Citrus Syndicate	—	0·49
Melfort Estate	—	—
Mguta Valley	—	—
Mount Darwin	0·01	Nil
Omeath	0·11	0·90
Ruia	0·28	—
Ruoko Ranche	0·16	0·89
Shamva	0·13	0·37
,, Mine	0·16	0·33
Sleamish	—	—
Stanley Kop	0·38	0·26
Sunnyside	0·54	0·58
Teign	0·70	0·74
Umvukwe Flats	—	—
Volynia Ranche	—	0·35
Waterfall Farm	—	—
Melsetter—		
Brackenburg	0·50	1·03
Chikore	2·07	0·88
Chipinga	1·97	0·94
Helvetia	3·21	3·15
Melsetter	1·18	—
Mount Selinda	3·58	—
Mutambara Mission	0·08	0·46
Pasture	0·06	0·33
Tom's Hope	1·08	1·30
Vermont	4·87	2·14
Salisbury—		
Ardbennie	0·14	—
Avondale	0·18	0·80
Botanical Experiment Station	0·08	0·95
Bromley	—	1·35
Brookmead	0·25	0·80
Chishawasha	0·01	0·27
Cleveland Reservoir	0·14	0·81
Forest Nursery	0·26	0·68
Glenara	0·40	—
Goromonzi	0·20	0·17
Gwebi	0·29	0·21
Hillside	0·41	—

RAINFALL *(Continued).*

Station	September	October
MASHONALAND—(Continued)		
Salisbury—continued		
Lilfordia	0·51	1·35
Salisbury (Agricultural Department)	0·22	—
,, (Club)	—	—
,, (Gaol)	0·55	0·77
,, (Railway)	0·57	0·40
Sebastopol	Nil	0·50
Selby	0·43	—
Stapleford	—	—
The Meadows	0·51	0·20
Westridge	0·23	0·72
Umtali—		
Chiconga's Location	0·22	1·16
Odzani	0·66	2·11
Penhalonga	2·60	1·10
Premier Estate	0·33	0·48
Public School	0·50	—
Stralsrund	Nil	0·62
Summerfield	—	—
Umtali (Railway)	0·47	—
Utopia	1·35	0·85
Victoria—		
Bikita	—	—
Chibi	0·53	0·77
Chilimanzi	0·75	1·29
Chingombe	2·71	0·81
Chiredzi Ranche, Ndanga	2·18	0·67
Clipsham	1·36	0·82
Eagle's Nest Ranche	1·85	1·26
Elephant Hill	—	—
Empress Mine	0·80	0·73
Eythorne	1·43	0·54
Fairburn	1·23	1·21
Fort Victoria	1·79	0·97
Gokomere	1·13	0·54
Gutu	2·19	0·51
Hunzanga	5·71	1·54
Makorsi River Ranche	0·65	0·81
Marah Ranche	2·10	1·65
Marthadale	—	—
Morgenster	1·91	1·58
Ndanga	2·84	1·09
Pamushana	1·70	0·66
Silver Oaks	1·28	1·12
Tokwe River Ranche	1·75	1·29
Victoria	1·78	—
MATABELELAND :		
Belingwe—		
Albany	0·92	0·13
Anglo-French Block	0·68	1·19
Filabusi	0·09	1·43
Fort Rixon	0·63	0·48

RAINFALL *(Continued).*

STATION	September	October
MATABELELAND—(Continued)		
Belingwe—continued		
Infiningwe	0·35	—
Insiza South	—	—
Insiza (Railway)	0·99	0·11
Mooifontein	—	—
Orangevale	—	0·24
Scaleby	0·60	1·13
Shangani (Railway)	0·98	Nil
Tamba	1·14	1·45
Thornville	0·92	0·10
Wedza	1·22	2·33
Bubi—		
Inyati	0·77	0·69
Leighton Farm	—	—
Lochard Experiment Farm	0·62	0·52
Bulalima—		
Figtree	—	—
Mholi (late Magot)	0·04	0·61
Marula	—	—
Plumtree School	0·08	—
Riverbank Farm	0·71	1·45
Solusi Mission	0·56	1·17
Syringa	0·02	0·39
Tegwani	0·05	0·88
Tjompanie	—	1·83
Bulawayo—		
Balla Balla (Railway)	0·19	0·98
Bembesi (Railway)	0·48	0·88
Bulawayo (Railway)	—	—
Crombie's	0·51	1·85
Edwaleni	0·63	0·78
Essexvale	0·34	1·10
Government House	0·39	—
Gwaai (Railway)	0·57	0·52
Heany Junction (Railway)	0·66	1·38
Holly's Hope	—	1·92
Hope Fountain		0·96
Imbesu Kraal	0·67	1·16
Impondemi	—	—
Keendale	0·38	1·92
Khami	0·40	1·40
Lower Rangemore	0·45	1·58
Matopo Mission	0·17	1·01
Maxim Hill	0·76	1·05
Melinakanda Junction	0·34	2·36
Naseby	0·34	1·00
Nyamandhlovu (Railway)	0·51	2·22
Observatory	0·40	—
Raylton	0·33	0·84
Rhodes Matopo Park	0·45	1·05
Umgusa	0·64	—
Umkien	—	—

RAINFALL *(Continued)*

Station	September	October
MATABELELAND—(Continued)		
Gwanda—		
Antelope Mine	0·05	1·53
Gwanda (Gaol)	0·09	2·24
,, (Railway)	0·15	2·13
Malundi	—	—
Mtshabzi Mission	0·34	1·71
West Nicholson (Railway)	0·11	1·34
Gwelo--		
Coppy Nook	—	—
Globe and Phœnix (Railway)	0·29	1·01
Gwelo (Gaol)	1·16	1·12
Gwelo (Railway)	1·53	1·25
Hagley	0·49	0·90
Indiva Farm	—	—
Lalapanzi	—	—
Lalapanzi (Railway)	0·55	0·85
Lower Gwelo	1·70	1·29
Que Que	0·58	0·90
Rhodesdale Estate	0·13	1·45
Selukwe (Railway)	2·57	1·14
Sikombela Farm	Nil	0·93
Troy	—	1·00
Umhlali Farm	—	—
Woodendhose	0·59	0·95
Mafungabusi—		
Gokwe	0·22	Nil
Inyoka	0·12	—
Mangwe—		
Empandeni	Nil	0·87
Garth	0·27	0·54
Tuli—		
Lamulas	0·21	2·23
Langalanga	0·07	2·90
Makalali	0·26	2·53
Manantji	0·25	2·74
Mazunga	0·21	3·78
M'pande	0·19	2·39
Tuli	0·38	3·10
Wankie—		
Bombusi	0·07	0·49
Guyo	—	—
Malindi (Railway)	0·08	1·03
Victoria Falls	0·05	0·33
Victoria Falls (Railway)	Nil	0·52
Wankie Hospital	,,	0·84
Wankie (Railway)	,,	1·02

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1915-16		
			December	January	February
Bembesi	Queen's Mine Hotel	V. C. Andrews	3	7	4
Bindura	Bindura	A. C. Mills	11	..	12
Charter—Mgezi	Beatrice Mine	W. Krienke	29	26	23
Central	Umvuma	B. M. Yorke	..	.	
Eastern Border (South Melsetter)	Various farmhouses	J. W. Scott	1	5	2
Enterprise	Arcturus Hotel	J. Watson	1	5	2
Felixburg	Felixburg	R. H. Brown	..	.	..
Figtree Branch, R.L. and F.A.	Figtree Hotel	W. H. Robertson	4	..	5
Gatooma	Gatooma	T. J. Golding	18	15	19
Gazaland	Chipinga	W. Wood	25	29	26
Greystone	Roodeheuvel Farm, Shangani	J. W. Spencer	11	8	12
Hartley	Hartley	J. de L. Nimmo	18	15	12
Headlands	Headlands	J. M. Harvard	25	29	26
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. H. Twilley	11	8	12
Insiza Shangani	Shangani	N. C. St. J. Brislin	..	1	..
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	11	8	12
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	11	8	12
Lomagundi	Sinoia	W. Abbott	18	15	19
Macheke	Macheke	W. J. K. Webster	No	dates fixed	
Makwiro	Makwiro	T. R. McLellan	17	21	18
Marandellas and Mangwendi	Marandellas Farmers' Hall	A. Nicholson	..	..	
Makoni	Rusape	H. Barnes Pope	4	1	5
Marula	Marula Siding	Mac. W. Ingram	25	22	26
Mashonaland	Commercial Hotel, Salisbury	J. Reid Rowland	1	5	2
Matopo Branch, R.L. and F.A.	Sibali	W. Bathurst	..	12	.
Mazoe	Glendale Siding	R. S. Newett	15		
Melsetter (North)	Various farms	Rev. R. Wodehouse	4		
Midlands	Gwelo	P.O. Box 23, Gwelo	11	8	12
Northern Umtali	Farm "Summerfield"	R. O. H. Blurton	.	1	..
Norton and District	Norton Siding	T. A. Osler	4	1	5
Que Que	Que Que	E. J. Ross	18	15	19
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	31	28	25
Shamva	Shamva	J. M. Moubray	No	dates fixed	
Selukwe	Selukwe	F. S. Clark	No	dates fixed	
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	8	
Umvukwe	Various ranches	H. K. Bracewell	11	8	12
Umtali	Christmas Pass Hotel	J. S. Holland	4	1	5
Victoria	Victoria	H. S. Heatson	15	19	16
Vungu	Vungu	J. H. Erasmus		..	
Western	Plumtree Hotel	A. Barclay	11	8	12

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a ¼ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, in

which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Farm Seeds

The undermentioned seeds grown on the Government Experiment Farms are now available for sale at the prices stated. The prices are f.o.r. Salisbury, or, when available from the Lochard Experiment Farm, f.o.r. Bembesi.

All orders for seed must be addressed to the Government Agriculturist, Department of Agriculture, Salisbury.

(1) *Specially* selected seed maize, Salisbury White, Hickory King 10 row and Hickory King 8 row, 15s. per 100 lbs.

(2) Selected seed maize of the above varieties, 12s. 6d. per 100 lbs.

The above shelled seed has all been carefully selected, tipped, butted and hand-shelled. Supplies are limited, and in order to meet the large demand, not more than one to two bags can be supplied to each applicant.

(3) Japanese and silver-hulled buckwheat, 10s. per 100 lbs.

(4) Dhal, 3d. per lb.

(5) Black sunflower seed, 2d. per lb.

(6) Victoria and Yellow Cross wheat, 15s. per 100 lbs.

(7) White flowering and large seeded linseed, 4d. per lb.

(8) Spanish and Virginia bunch ground-nuts, 20s. per 100 lbs.

(9) German and Japanese millet, 3d. per lb.

(10) Teff grass seed, 3d. per lb.

(11) Feterita kafir corn (new introduction), 15s. per 100 lbs.

(12) Napier fodder roots, 5s. per 100, £2 per 1,000.

All orders must be accompanied by remittances for the full amount of seed ordered, and in cases where delivery is to a siding, the amount of railage must be added. Should it be found impossible to complete any order, the balance of cash will be refunded to the purchaser.

Co-operative Seed Distribution

The following seeds of summer crops are offered f.o.r. Salisbury for trial under the usual terms of co-operative experiments. The experimenter is required at the close of the season to forward to the Agricultural Department, on forms supplied for that purpose, an accurate report of the result of his experiments.

Seed is supplied in sufficient quantity to sow from ¼ to 1 acre according to variety, and not more than four varieties can be sent to any one applicant. All applications, together with full particulars regarding forwarding, should be addressed to the Government Agriculturist, Department of Agriculture, Salisbury.

1. *Summer Cereals.*—Victoria Wheat and other varieties of summer wheat, Burt, Smyrna and New Zealand Oats, and improved varieties of Rice.

2. *Oil Seeds.*—Linseed, Castor Oil, annual and perennial, Sunflower, black Russian, and Ground-nut varieties.

3. *Leguminous Crops.*—Velvet Beans and Dhal.

4. *Hay Crops.*—German Millet, Japanese Millet and Teff Grass.

5. *Root Crops.*—Mangel, Sugar Beet, Carrots and Cattle Radish.

6. *Fibre Crops.*—Hemp, Jute, Mauritius Hemp, Ramie and Sunn Hemp.

7. *Miscellaneous Crops.*—Japanese and Silver - hulled Buckwheat, Majorta Melon, New Zealand Spinach (vegetable), Rape and Cattle Kale.

8. *Pasture Plants and Grasses.*—Napier's Fodder slips, Paspalum, Sheep's Burnet, Tall Fescue and Beggar Weed (legume).

Forestry—Sale of Trees

The undermentioned varieties of trees will be available for sale from December onwards.

Price, f.o.r., Salisbury, 1d. each, 8s. 4d. per 100.

The following reductions are made on large orders on condition that the tins are returned. Otherwise they will be charged up at 3d. per tin :—

£3 per 1,000. £2 10s. per 1,000 for orders of over 5,000.

Average height of trees—3 to 9 inches.

Average number in tin—25.

Average weight of tin—25 lbs.

Belhambra.
Callitris calcarata—Cypress pine.
  do. robusta—Murray pine.
Casuarina leptoclada—Beefwood.
Cedrela toona—Toona.
Cupressus arizonica.
  do. sempervirens, var. pyramidalis—Churchyard cypress.
  do. sempervirens, var. horizontalis — Common cypress.
  do. torulosa—Himalayan cypress.
Dalbergia sissoo—Sissoo.
Eucalyptus amygdalina—Peppermint gum.
  do. botryoides.
  do. calophylla—White flowering gum.
  do. citriodora—Lemon-scented gum.
  do. corynocalyx—Sugar gum.
  do. crebra—Ironbark.
  do. leucoxylon.
  do. longifolia.
  do. melliodora—Grey box gum.
  do. microtheca—Coolibah gum.
  do. paniculata—Ironbark.
  do. robusta.
  do. rostrata—Red gum.
  do. saligna.
  do. salmonophloia.

Jacaranda.
Pinus halepensis—Aleppo pine.
do. longifolia—Chir pine.
Tristania conferta.
Thuya orientalis—Arbor vitæ.

Also in stock larger trees at 3d. each; average height of tree, 9 inches to 2 feet 6 inches; average weight of tins, 25 lbs.; number in tin, 4.

Fourcroya gigantea (Mauritius hemp), 1s. per 100.
Agave sisilana (Sisal hemp), 3s. per 100.
Paspalum, 5s. per 1,000 rooted slips.

Shrubs for Sale

Price, f.o.r., Salisbury, 6d. each. There is no guarantee to have any particular variety of shrub in stock, but everything possible will be done to supply the demand. Most of them are planted four in a tin, but there is usually a fair stock of single tins.

Red.

	Approx. height of growth.
Holmskioldia	8 ft.
Habrothamnos	5 ft.
Tecoma capensis	6 ft.
Hibiscus, single	8 ft.
do. double	8 ft.
Bottle brush	10 ft.
Russellia	3 ft.
Pomegranate	8 ft.
Bauhinia	8 ft.
Oleander	7 ft.
Euphorbia jacquiniflora	4 ft.
Sterculia—Coral tree	10 ft.
Plumieria (Frangipane)	8 ft.
Salvia	3 ft.
Cape May	3 ft.
Homelia patens	3 ft.

Pink.

Mallow	3 ft.
Lagerstrœmia flosregina	10 ft.
Alamanda	6 ft.
Sensitive plant	1 ft.

Blue.

Iochroma lanceolatum	10 ft.
Duranta	10 ft.
Plumbago	3 ft.
Heliotrope	3 ft.
Buddleia	6 ft.
Brunfelsia eximia—Natal violet	5 ft.
Rhodesian tree violet—Securidaca	15 ft.
do. lobelia	3 ft.
do. lupin	6 ft.
do. wistaria	20 ft.

White.

Spirea (Cape May)—4 varieties	4 ft.
Duranta	10 ft.
Lantana bush	8 ft.
Althea, single—"Xmas rose"	5 ft.
do. double	5 ft.
Gardenia	4 ft.
Plumbago	3 ft.
Bauhinia	8 ft.
Philadelphus	6 ft.
Deutzia	5 ft.
Moon flower	6 ft.
Magnolia	14 ft.
Plumieria—Frangipane	8 ft.
Oleander	7 ft.
Tree lupin	6 ft.
Pittosporum undulatum	7 ft.
Lemon-scented verbena	5 ft.
Rhodesian tree violet	15 ft.

Yellow.

Tecoma Smithii	10 ft.
Thevetia nerifolia	6 ft.
Cape jasmine	10 ft.
do. laburnum	10 ft.
Holmskioldia	10 ft.
Buddleia	10 ft.
Alamanda nerifolia	4 ft.
Streptosolon Jamesonii	3 ft.
Abutilon—"Chinese lantern"	8 ft.
do. —variegated leaf	8 ft.
Poinsettia	8 ft.
Cestrum aurantiacum	5 ft.
Hypericum—St. John's Wurt	4 ft.
Asclepias	3 ft.
Ribes	3 ft.
Naudina domestica	4 ft.
Galphinia nitida	4 ft.

Mauve.

Iochroma	10 ft.
Moon flower	4 ft.
Salvia	2 ft.

Climbers.

Golden shower—Yellow.
Bignonia tweediana—Yellow.
Clitoria ternata—mussel shell creeper—Blue.
Potato creeper (Solanum Wenlandii)—Blue.
do. small variety—Blue.
Phaseolus caracalla—White.
Beaumontia—White.
Jasmine—White.
Podranea—Zimbabwe creeper—Pink.
Dutchman's pipe (Aristolochia sypho).

Applications together with remittances and full particulars regarding forwarding should be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to

be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following:—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which

may be brought under irrigation schemes, together with rough estimates of costs.

3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.

No. 62. Services of Agricultural Engineer.

No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.

No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.

No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.

No. 94. Second Report on Experiments, by J. H. Hampton.

No. 125. Subterranean Water, by W. M. Watt.

No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.

No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.

No. 166. Rhodesian Citrus Fruits—Exportation to London.

No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.

No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.

No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.

No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.

No. 206. Hints on Irrigation : Small Earthen Storage Reservoirs, by W. M. Watt.

No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.

No. 212. Citrus Fruits in Rhodesia, by A. G. Turner.

No. 216. Useful Measurements of Maize, by J. A. T. Walters, B.A.

No. 218. Manuring of Maize on Government Experiment Farm, Gwebi, by A. G. Holborow, F.I.C.

No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.

Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.

No. 106. Cultivation and Preparation of Ginger.

No. 126. Turkish Tobacco.

No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.

No. 138. **Tobacco Culture (Virginia)—Harvesting and Curing.**

No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.

No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.

No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.

No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.

No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.

No. 179. Buckwheat, by H. G. Mundy, F.L.S.

No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.

No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.

No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.

No. 194. Rye, by J. A. T. Walters, B.A.

No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.

No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.

No. 58. Onion Thrips, by R. W. Jack, F.E.S.

No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.

No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.

No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.

No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.

No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.

No. 147. Root Gallworn, by R. W. Jack, F.E.S.

No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.

No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.

No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.

No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.

No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.

No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.

No. 178. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.

No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.

No. 197. Chafer Beetles, by R. W. Jack, F.E.S.

No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.

No. 214. Some Household Insects, by R. Lowe Thompson, B.A.

No. 219. More Household Insects, by R. Lowe Thompson, B.A.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.

No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.

No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.

No. 74. The Detection and Prevention of Diseases of Stock in Rhodesia, by Ll. E. W. Bevan, M.R.C.V.S.

No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.

No. 95. Oestrus-ovis in Sheep, by Alec King.

No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.

No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.

No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.

No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.

No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.

No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.

No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

No. 215. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.

No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.

No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.

No. 163. Feeding and Care of Imported Cattle, by R. C. Simmons.

No. 167. The Construction of Dipping Tanks for Cattle.

No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.

No. 208. Water in the Diet of Live Stock, by Ll. E. W. Bevan, M.R.C.V.S.

No. 210. The Care and Feeding of Calves in Dairy and Stud Herds, by R. C. Simmons.

No. 211. The Fattening of Pigs on Granite Farms in Mashonaland, by R. C. Simmons.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.

No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.

No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.

No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.

No. 150. Dry Season and Droughts in Rhodesia, by the Rev. E. Goetz, S.J.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 157. Hints on Brickmaking, by G. T. Dyke.

No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

No. 205. Home Butter Making, by R. C. Simmons.

No. 213. Hydraulic Rams, by W. Martin Watt.

No. 217. Windbreaks and Hedges, by F. B. Willoughby.

Malarial Fever : How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

The Prevention and Treatment of Blackwater Fever, by Dr. A. M. Fleming.

Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law : Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc

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HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

D. & R.—Farm assistant; £5 per month and food.

J. C. J.—For learner; must be strong and willing to give services in return for keep. Rusape.

SITUATIONS WANTED.

P. G. C.—As manager of farm. Experience in all branches of farm work.

W. E. P. N.—As assistant on farm. Good practical experience. At present residing at Christiana. Would like fare paid, which can be deducted from salary.

C. S.—As assistant on farm. Six years' experience with cattle and general farming in Cape Colony.

F. R. T.—As manager on farm; thoroughly experienced in mixed farming; 29 years in South Africa and 7 years in Rhodesia; good references. Salary, £6 per month and everything found; percentage of crops.

E. S. M.—Position as creamery manager or butter maker; experienced, holding good references. Englishman.

G. A. M.—As farm manager; experience includes practical work with stock, fruit, mixed farming, building, fencing and machine repairs.

H. H.—As manager, married man, many years' South African experience on very large farm; stock, dairy and general agriculture.

C. Sp.—As assistant. Experience with irrigation work.

F. L. H.—Englishman (unfit for military service) as farm assistant; cattle and agriculture. Remuneration and board.

N. E. G.—As assistant. Natal experience.

C. G. T.—As assistant. Experience of farming. Speaks Dutch and native languages.

A. P.—As manager. Rhodesian experience.

J. R.—Experienced agricultural and stock farmer; would open up new farm by preference. Good references.

S. M. W.—Would help on farm; experienced fitter-mechanic. Wounded in war and discharged.

F. C. W. R.—Assistant; four years' farm experience.

R. T. T.—As assistant. Rhodesian experience.

J. B. H.—To manage farm or on shares. Best Rhodesian references.

A. T. G.—As assistant. Experienced with cattle, pigs and general farming.

C. M.—As assistant, youth of 18; experienced with cattle, milking and ploughing.

Wanted.

The following numbers and indices of the *Rhodesia Agricultural Journal* are out of print, and have been enquired for by a reader, who is willing to pay 5s. each for them :—

Vol. I.—Nos. 5 and 6, plus index.
Vol. V.—Index.

In addition to the above, the following have been enquired for :—

Vol. I.—Nos. 2 and 6.
Vol. II.—Nos. 1 to 3.
Vol. III.—No. 1.
Vol. IV.—Nos. 1 and 4.
Vol. V.—No. 2.
Vol. X.—No. 2.
Vol. XI.—No. 3.
Indices to Vols. I., II., III. and V.

If any readers have any of these *Journals* and indices in their possession, and do not require them, we shall be very pleased if they will kindly send same to the Editor. If it is desired, they can be exchanged with any they may have missing, if available.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:—*

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner,

unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

Veterinary Districts of Southern Rhodesia.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 247 of 1915.] [23rd July, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 526 of 1914, 167, 175 and 179 of 1915, and in terms of section 12 of Government Notice No. 50 of 1912, declare the following to be areas of infection and guard areas :—

2. UMTALI NATIVE DISTRICT.

(b) *Guard Area.*

The farms N'odzi and Nyagari and the Penhalonga Valley.

3. MELSETTER NATIVE DISTRICT.

(a) *Areas of Infection.*

(1) Highlands, Rockwood and Joppa Farms.
(2) Clearwater, Nooitgedacht, Randfontein and Avontuur Farms.
(3) Enhoek, Ravenswood, Roslyn, Woodstock, Landsdown, Heilrand and Kenilworth Farms.
(4) Wolvedraai Farm.
(5) Houtberg Farm.
(6) Springfield Farm.

(b) *Guard Area.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nayanyadzi River.

No. 375 of 1915.] [15th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 194 of 1915 and section 1 of Government Notice No. 247 of 1915, and declare the following areas of infection and guard area in lieu thereof :—

1. SALISBURY AND MAZOE NATIVE DISTRICTS.

(a) *Areas of Infection.*

(1) M.T.C., Gallagher's Lease, Makabusi, Epworth, Adelaide and Glenwood farms.

(2) Sternblick farm.

(3) Bluff Hill farm.

(4) Sigaro farm.

(5) Mabelreign farm.

(6) Borrowdale Estate, Helenvale, Glen Lorne, Luna and Greystone farms.

(7) An area bounded by and including the following farms :—Belford Estate, Belford Estate No. 2, Belford Estate North, vacant land on which the Jumbo Mine is situated, Whitfield, Yarrowdale, 100-acre lots, vacant land, Tjibakwe and Belford Estate No. 3.

(b) *Guard Area.*

An area bounded by and including the following farms :—Bitton, Syston, The Lily, Killiemore, Penrose, Derry, Glen Lussa, Rainham, Gillingham, Park Ridge, Crowborough, Lochinvar, eastern sub-division of Willowvale, Glen Norah, Hopley, Saturday Retreat, Reserve, Odar, Stoneridge, Eyrecourt, Boutelle, Twentydales, Nalire Reserve, Mayfair, Galway Estate, Sebastopol, Gardiner, Father Hartmann's farm, Chishawasha, The Crag, Umritsur, Mount Shannon, Halstead, Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Mooi Leegte, and Reserve.

No. 283 of 1915.] [20th August, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard areas :—

(a) *Area of Infection.*

The farm Quagga's Hoek, in the native district of Melsetter.

(b) *Guard Areas.*

(1) That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

(2) That portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 393 of 1915.] [29th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Carrickcreagh, in the native district of Salisbury, to be an area of infection.

No. 394 of 1915.] [29th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection :—

(1) Melsetter native district—the farms Rumble Rills, Groenvlei, Cecilton and Quagga's Hoek.

(2) Umtali native district—the farm Penkridge.

No. 400 of 1915.] [5th November, 1915.

AFRICAN COAST FEVER.

Transport Cattle.

WHEREAS it is necessary to afford facilities for transport with oxen between Lalapanzi area and Iron Mine Hill area, as described in the schedule to Government Notice No. 387 of 1914, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," do hereby declare that the above-mentioned areas shall be regarded as one for the purposes of working draught cattle.

No. 438 of 1915.] [26th November, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Ostend, in the native district of Melsetter, to be an area of infection.

No. 381 of 1914.] [3rd September, 1914.

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of this Notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe and Gwanda.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 527 of 1914.] [31st December, 1914.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the 1st day of January, 1915, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including the Salisbury native district bounded by and including the following farms:—Lilfordia, Saffron Walden, Kilworth, Porta, Outspan, Clements' Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Odar Outspan, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Caledonia, Hartmans, Chishawasha, Glenlorne, Borrowdale, sections 4 and 1, The Willesden, Lowdale, Ingleborough, Mguta, Great B, Umsasa, Springvale, Passaford, Spa, Fairview, Nalire, Penrose.

No. 70 of 1915.] [4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms:—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar,

Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 206 of 1915.] [25th June, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

All surveyed farms in the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge and Biriwiri, including the Ingorima Reserves and Mafusi Reserve, and excluding the farms Umzelezwe, Nyagadzi, Mhungura, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera.

No. 271 of 1915.] [13th August, 1915.

COMPULSORY DIPPING OF CATTLE: ENTERPRISE SECTION OF SALISBURY DISTRICT.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before 8th October, 1915.

Description of Area.

An area bounded by and including the following farms:—Halstead, Mount Shannon, The Meadows, Ivordale, Ivanhoe, Oribi, Colga, Neptune, Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley, Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chishawasha, Stuhm, The Springs, The Grove and Umritsur.

No. 309 of 1915.] [27th August, 1915.

COMPULSORY DIPPING OF CATTLE: MELSETTER AND UMTALI DISTRICTS.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have, by a majority of votes, requested His

Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before 28th October, 1915.

Description of Area.

All surveyed farms and the Ingorima and Mafusi Reserves in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali: Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrew's, Cronley and Lisnacloon.

No. 318 of 1915.] [3rd September, 1915.

AFRICAN COAST FEVER. COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri, and the Nyanyadzi River; and that portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 355 of 1915.] [1st October, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 527 of 1914, and declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area in the Salisbury and Mazoe native districts bounded by and including the following farms:—Lilfordia, Saffron Waldon, Kilworth, Porta, Reserve, Clement's Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Reserve, Odar, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, western portion of Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Mooi Leegte, Reserve, Bitton, Syston, The Lily and Killiemore.

No. 378 of 1915.] [15th October, 1915.

COMPULSORY DIPPING OF CATTLE: MAKWIRO AREA, HARTLEY DISTRICT.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before 17th December, 1915.

Description of Area.

An area bounded by and including the following farms:—Umfulia, Dorothy Hill, vacant land, Seigneury Reserve, Zimbo Junction, Serui Drift, Strathmore, Cactus Hill, Thorndyke, Impofhoe, Railway farm No. 22, vacant land between Railway farm No. 21 and Spencer, Spencer, Railway farm No. 23, Woodsgift, Railway farm No. 25, Southwood, Northwood, Niklot, Rothwell Extension, Hunyani Estate, Hunyani Estate No. 2, Pulham, Cromdale, Garthnor, Serui, Curlewood, Cotswold, and vacant land and farms lying within a line from the most easterly beacon of Cotswold to the north-east beacon of Fort Martin, thence to the south-east beacon of Fort Martin, and from there due south to the Umfuli River and down that river to the farm Umfulia.

No. 379 of 1915.] [15th October, 1915.

COMPULSORY DIPPING OF CATTLE: SALISBURY, MAZOE AND HARTLEY DISTRICTS.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before the 17th December, 1915.

Description of Area.

An area bounded by and including the following farms:—St. Mary's, Stoneridge, Odar, Reserve, Saturday Retreat, Chizanza, Suum Cuique, Arbroath, Langford, The Rest, Amalinda, Oatlands, Warwickshire, Clement's Plot, Reserve, Porta, Lyndhurst, Riverside, Herren Hausen, Lilfordia, Killiemore, The Lily, Ballineety, Fairview, Spa, Passaford, Springvale, Mbebi, Umsasa, Great B, Christon Bank, St. Gerera, Willesden farm, Borrowdale Estate, Luna, Glen Lorne, Gletwyn, Sternblick, Manresa, Caledonia, Sebastopol, Galway Estate, Mayfair, Nalire Reserve, Buena Vista, and Seki Reserve.

No. 402 of 1915.] [5th November, 1915.

COMPULSORY DIPPING OF CATTLE: ENTERPRISE SECTION OF SALISBURY NATIVE DISTRICT.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Halstead, Mount Shannon, The Meadows, Ivordale, Ivanhoe, Oribi, Colga, Neptune, Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley, Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chishawasha, Stuhm, The Springs, The Grove and Umritsur.

No. 423 of 1915.] [19th November, 1915.

COMPULSORY DIPPING OF CATTLE: MELSETTER AND UMTALI DISTRICTS.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

All surveyed farms and the Ingorima and Mafusi reserves, in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali: Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrews, Cronley and Lisnacloon.

No. 337 of 1915.] [17th September, 1915.

ENZOOTIC ABORTION.

IT is hereby notified for public information that nothing contained in the several Government Notices declaring certain areas to be actively infected with the disease known as enzootic abortion, for the purposes of the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amending Ordinance, 1911," shall be taken to prohibit the movement of oxen to, from or through such areas, subject to compliance with the laws and regulations governing the movement of cattle.

No. 505 of 1914.] [10th December, 1914.

CLOSING OF GATES ON ROADS, ETC.

UNDER and by virtue of the powers vested in me by section 26 of the "Fencing Ordinance, 1904," I do hereby provide that travellers passing through a gate erected on a public or private road in terms of section 25 of the said Ordinance, and omitting to close such gate after having passed through, shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address..
2. Number and Class of Cattle to be imported...
3. Area or Farm and District where Cattle are at present located..............
....
4. Area or Farm and District to which Cattle are to be moved.................
....

Applicant's Signature...

Date...................................

Application...........................

Permit No...........................

ANNEXURE "B."

I, ... residing on the farm .... in the district of .... do solemnly and sincerely declare that the .... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals .... Bulls .... Heifers ....

Breed ....

Seller's Name and Address ....
....

Purchaser's Name ....

Place in Southern Rhodesia to which animals are being sent
....

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at .... on this .... day of................. before me,

....

Resident Magistrate for the District of ....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London
Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, Etc.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries:—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals, nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date................................., 19...

Place ....

....

Signature of

Government Veterinary Surgeon.

Number and general description of animals:

...............Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent:

....

Owner's name and address:

....

....

Place in Southern Rhodesia to which it is desired to send the animals

....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at ....
in the district of... .... in the.............................
Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to...................................† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at..on this..............
day of...before me.

....
Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent................................
Owner's name and address...
....
Place in Southern Rhodesia to which animals are being sent.......................

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.
Gwanda.
Plumtree.
Fort Rixon.
Belingwe.
Inyati.
Fort Usher.
Mphoeng's.
Holi.
Filabusi.
Gwaai.
Figtree.
Umvuma.
Que Que.

No. 410 of 1915.] [12th November, 1915.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Mazunga.
Makwiro.
Banket Junction.
Makaha.
Tuli.
Sinoia.
Buhera.

No. 375 of 1912.] [28th November, 1912

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches; and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows:—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sabl Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows:—

In Mashonaland:
Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland:
Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Open areas.

The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following areas in the Hartley district and the Sebungwe district until further notice.

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

Sebungwe District.—From the confluence of the Sengwe and Lutope Rivers up the Lutope to its headwaters, thence in a south-east and easterly direction following the southern edge of the escarpment, leaving Meare's farm to the south, to the Mafungabusi Peak, thence northwards along the escarpment to the Njelele River, and down that river to its confluence with the Sanyati River, thence northwards down the Sanyati River to its confluence with the Piriwiri River, thence direct in a north-westerly direction to Picaninyemba, and thence along the footpath to Nenyunka on the Sengwe River, thence southerly up the Sengwe River to its confluence with the Lutope.

Lomagundi.—An area bounded by a line drawn from the junction of the Angwa and Mkwichi Rivers up the Angwa to the point where the Sinoia-Urungwe Road crosses that river; thence along this road in a south-easterly direction to the Hunyani River; thence down that river to a point opposite Mokore Hill; thence westerly direct to the point first named.

Elephants, Hartley District.—Notice No. 168 of 1914 permits the shooting or capturing of elephants on or within five miles of the farm Walden, in the Hartley District, for a period of one year from 9th April, 1914.

The game specified may be shot in these open areas without a licence.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

No. 390 of 1912.] [19th December, 1912.

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds :—

(1) Great Locust Bird or White Stork (*Ciconia alba*);
(2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*);
(3) Small White Heron or Cattle Egret (*Bubulcus ibis*);
(4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 171 of 1915.] [21st May, 1915.

PROTECTION OF GAME ON COMMONAGES.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that up to the 30th day of April, 1916, all game within the limits of the commonage or townlands of Umtali shall be strictly protected, and shall not be hunted or destroyed.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 287 of 1915.] [27th August, 1915.

AGRICULTURAL STATISTICS.

UNDER and by virtue of the powers conferred on me by the "Agricultural Statistics Ordinance, 1914," I do hereby cancel Government Notice No. 399 of 1914, as amended by Government Notice No. 496 of 1914, and make the subjoined provisions for the collecting of statistics or estimates in terms of the said Ordinance.

1. Statistics shall be collected by the Director of Agriculture in relation to crops, citrus fruits, irrigations, fencing and dipping tanks.

2. The form set out in the annexure hereto shall be used for the purpose of collecting such statistics, and should be completed in accordance with the instructions accompanying the same, by all persons in charge of farms or estates, whether as owners, lessees, managers, servants or occupiers or acting on behalf of such persons, and transmitted to the Director of Agriculture not later than the date fixed in the instructions accompanying the said form.

3. Any person who without reasonable cause makes default in complying with the requirements of the last preceding section shall be liable on conviction to a fine not exceeding fifty pounds, or in the case of a continuing default to a fine not exceeding one pound for every day during which the default continues.

ANNEXURE.

Crops already Harvested, Season 1914-15.

	Acres under crop.	Total yield.	Amount reserved for home consumption and seed.
Maize	......	......bags of 203 lbs.	......bags of 203 lbs.
Kaffir corn	......	......bags of 203 lbs.	......bags of 203 lbs.
Monkey nuts	......	......bags of 83 lbs.	......bags of 83 lbs.
Potatoes	......	......bags of 153 lbs.	......bags of 153 lbs.
Sunflower	......	......lbs. net	......lbs. net
Wheat (Summer)	......	......bags of 203 lbs.	......bags of 203 lbs.
Tobacco	......	......lbs. net	......lbs. net
Ensilage	......	......No. of tons	
Other crops for grain	......	....	....
Other crops for fodder	......	....	....

Citrus Fruits.

Orange trees ... ... No. bearing...... No. not yet bearing......
All other citrus trees ... No. bearing...... No. not yet bearing......

Prospective Crops yet to be Harvested during 1915.

	Acres under crop.	Estimated yield.
Potatoes	....	...............bags of 153 lbs.
Wheat (Winter)	....	.... ,, 203 lbs.
Other crops	....	....

Irrigated Land.

Gross area under irrigation ... ...acres
Source of water supply (whether from stream, well, storage dam, etc.) ... ...
Nature of works (whether by gravitation or pumping, or by a combination of both) ... ...

N.B.—If any of the above-mentioned crops have been grown under irrigation, please state the fact.

Fencing.

Boundary fencing (*i.e.*, separating the farm from its neighbours) ... ...miles
Inner fencing (*i.e.*, separating portions of the farm itself) ....miles

Dipping Tank.

Please state whether there is a dipping tank on your farm...................... [redacted]

Name* of farm (or farms) covered by the above return—
....

Signature................................
Full postal address............................
....

N.B.—For the purpose of calculating the acreage, please note that the length multiplied by the breadth, in yards or paces, divided by 4,840, equals number of acres. That is, roughly, 70 x 70 yards or paces, or 60 x 80, or 50 x 97, or 40 x 121, equals one acre.

No. 432 of 1915.] [26th November, 1915.

THE attention of the public is called to section 23 of the "Stock and Produce Theft Repression Ordinance, 1907," which reads as follows :—

"Any person who shall, by way of purchase, bargain, exchange or gift, acquire or receive into his possession from any other person any stolen stock or produce, without guilty knowledge that the said stock or produce is stolen, but without having reasonable cause, proof of which shall lie on such first-mentioned person, for believing at the time of such acquisition or receipt that the said stock or produce was the property of the person from whom he received it, or that such person was duly authorised by the rightful owner to deal with or dispose of it, shall be deemed guilty of contravening this section, and shall be liable on conviction to a fine not exceeding one hundred pounds, or to imprisonment, with or without hard labour, for a period not exceeding twelve months, or to both such fine and such imprisonment."

---

*That is, the original and officially-recognised name which appears on the title deeds and diagrams.

It is not enough merely to take the word of persons, especially natives, offering stock for sale, that such stock belongs to them, but unless the person offering such stock for sale is known to the purchaser, other evidence should be demanded of the ownership of the stock.

Under section 40 of the same Ordinance persons travelling about acquiring stock from natives must report every purchase to the Native Commissioner of the district within fourteen days of the purchase, giving a full description of the stock purchased and the manner and locality in which the stock was obtained. The penalty for non-compliance with section 40 is a fine of £25 or three months' imprisonment or both.

WIDTH OF PUBLIC OR PROCLAIMED ROADS.

AS complaints have been made by the travelling public that in many places landowners or occupiers of farms are ploughing up portions of roadways, or otherwise interfering with the surface of roads, the attention of landowners and occupiers of farms is drawn to section 15 of the "Outspans and Roads Regulations, 1898," which reads as follows :—

"All public roads, or roads declared by the Administrator to be open, shall be deemed and are hereby declared to be 100 (one hundred) feet wide; and, if unfenced, loose cattle and horses driven along any such road may travel on either side of such road to a distance of at least one hundred feet without being liable for trespass or for injury done to crops within that distance; provided that the provisions of this clause shall not apply to any road which has been laid out upon the authority of the Public Works Department of Rhodesia, if of less width than one hundred feet, along that portion of the land which shall have been fenced previous to the passing of these regulations."

A width of 50 feet on each side of the centre of such roads should, therefore, not be ploughed, planted or otherwise interfered with.

No. 350 of 1915.] [1st October, 1915.

IT is hereby notified for public information that all communications for the consideration of the Administrator in terms of the "Water Ordinance, 1913," or regulations framed thereunder, should be addressed to the Water Registrar, Department of Agriculture, Salisbury.

No. 439 of 1915.] [26th November, 1915.

IT is hereby notified for public information that Government Notice No. 331 of 1914 is cancelled, and in lieu thereof His Honour the Administrator has been pleased to frame the subjoined regulations under and by virtue of the powers conferred on him by the "Water Ordinance, 1913."

PRELIMINARY.

1. In these regulations the expression "the Ordinance" shall mean the "Water Ordinance, 1913," or any amendment thereof.

"Registrar" shall mean the Water Registrar appointed in terms of section 2 of these regulations.

"Clerk" shall mean the Clerk of the Water Court.

2. For the purposes of the Ordinance and these regulations there shall be an officer styled the "Water Registrar," whose duty shall be to keep a record of all proceedings and transactions under the Ordinance and these regulations, and to perform such other duties thereunder as the Administrator may from time to time appoint.

APPLICATION FOR THE USE OF WATER.

3. Any person desiring the use of water, in terms of Chapter I. of the Ordinance, shall make application to the Administrator through the Water Registrar for the same materially in the Form "A" appended to these regulations.

4. The Administrator may, on receipt of an application as aforesaid, cause notice of the same to be published for the information of persons whose rights might be affected. Such notice may be by publication in the *Gazette* or such other means as may be deemed expedient, and shall call upon such persons to lodge, within three months from the date of such notice, their objections (if any) to the granting of such application, and a full statement of the grounds for such objections.

5. In any case where the granting of the use of water might prejudicially affect the rights of natives in reserves, a notice as aforesaid shall be furnished to the Chief Native Commissioner.

6. At the expiration of the period for lodging objections as aforesaid, the Administrator shall proceed to consider the application, and make such order thereon as he may deem fit; provided, however, that before making any such order he may cause such evidence to be furnished in support of the application or objections as he may deem necessary, or if such course appears expedient he may refer the matter to a Water Court for its consideration and decision.

7. All decisions of the Administrator or of a Water Court in respect of applications for the use of water as aforesaid shall be recorded with the Registrar.

WATER COURTS.

8. Every member of a Water Court, on taking his seat for the first time, shall, before proceeding to any business, take the following oath :—

> I, ... A. B. .... do solemnly swear that I will to the best of my skill and knowledge, and without fear, favour or prejudice, enquire into and decide and determine all matters which may come before this Court for hearing and determination. So help me God.

This oath shall be taken in the presence of the other members and of the bystanders, or of any Justice of the Peace.

9. There shall be a Clerk to each Water Court, who shall take the following oath :—

> I, ... A. B. ....do swear that I will truly and faithfully execute the office of Clerk of this Water Court without fear, favour or affection for any one; and that I will not by myself or any other receive or take for my own use any fee or reward for anything done by me in my said office. So help me God.

Such oath shall be taken before the President or a Justice of the Peace, and an entry thereof shall be made by the said Clerk in his books, and shall be signed by the person before whom such oath was taken.

10. The Clerk shall be the issuer of the process of the Water Court, and shall perform such other duties in respect thereto as may from time to time be required or are proper to be done by a Clerk of a Court.

11. The Clerk shall have the like powers of summoning parties and witnesses in any proceedings before a Water Court as are possessed by a Clerk of a Magistrate's Court in respect of proceedings before such Court, and all persons duly summoned to appear before a Water Court who shall without lawful cause fail or neglect to appear shall be liable to the penalties provided for like offences under any law in force governing the procedure in Magistrates' Courts.

12. The rules, orders and regulations governing the manner and form of proceedings in civil matters before Courts of Magistrates, and the fees and charges to be taken by the officers and practitioners of such Courts, shall *mutatis mutandis* apply and be followed in Water Courts.

The rules of Magistrates' Courts controlling the procedure in appeals to the High Court shall *mutatis mutandis* apply to appeals from Water Courts to the High Court.

13. The Messenger of the Magistrate's Court of the magisterial district in which the Court will sit shall be the officer charged with serving the notices and processes and carrying out the orders of the said Water Court. Whenever such Messenger cannot serve any such notice or execute any such process, the Magistrate of the district may require any police constable to serve the notice or execute the process. Provided that any such notice or process, but no order of a Water Court, may be served upon any party to or person required as a witness at the proceedings, either by a party or by his attorney or agent, or by the duly authorised representative of such party, attorney or agent. Provided further where such service is not effected by the Messenger, and it is alleged by a party or by a person whose attendance is required as a witness that he has not been duly served with the prescribed notice or process, the Water Court shall require the party on whose behalf such notice or process is alleged to have been served to satisfy it, by affi-

davits or otherwise on oath, that the same has been duly served. The Messenger or the other person serving a notice or process shall, so far as may be, act in accordance with the rules prescribed for and the practice adopted by the Messenger of the Magistrate's Court of the district in which the Water Court sits.

The oath of the Messenger of the said Court shall be as follows :—

> I, ... A.B. .... do swear that faithfully and diligently I will serve the office of Messenger of this Court, and execute and serve all notices, orders and processes thereof without favour or affection for any one; and that I will not, by myself or any other, take, receive or demand any other than such lawful fees as I may be permitted by this Court to receive for anything done by me in my said office. So help me God.

14. It shall be lawful for the President of a Water Court to administer an oath to any witness called, to the effect that the evidence he shall give regarding the matters and things that shall be lawfully required of him shall be the truth, the whole truth, and nothing but the truth, so help him God.

15. The Clerk shall take down the evidence and proceedings in writing, and shall also note any objections made by any party in respect of any evidence or any document tendered by any party to the Court or received by such Court; provided that, whenever the President thinks it expedient to do so, he may himself take down the evidence or cause the same to be taken by a competent shorthand writer, and thereupon their notes of such evidence shall form part of the record.

16. A Water Court may at its discretion sit at such places as may be convenient to the parties interested and may adjourn from time to time and from place to place as occasion may require, and shall determine in the simplest, speediest and cheapest manner possible all such matters as may be brought before it for investigation or decision.

17. The Clerk shall enter in the Record Book of the Court the terms of any judgment given or order made in any matter before such Court, and shall sign the same, after having submitted it to the members of the Court; and shall thereafter, as soon as may be, prepare copies of such judgments or orders, signed by him, and transmit the same to the Registrar. He shall further furnish a signed copy of such judgment or order to each of the parties to the case or proceedings.

"A."

APPLICATION FOR USE OF WATER.

Chapter I., "Water Ordinance, 1913."

The Water Registrar,
Department of Agriculture.

The undersigned hereby applies for the use of water in terms of Chapter I. of the "Water Ordinance, 1913," and states as follows :—

(1) The applicant is the owner (or agent lawfully authorised by the owner, as the case may be) of the following land in the native district of......
....

Description of Land.

(a) Registered name ....
(b) Area of farm..............................
(c) Form of title ....
(d) Mining rights to water granted thereon (if any)..................................

(2) The applicant desires authority to use water from the public stream
....

for the following purposes :—..
....
....
....
....

(3) The applicant attaches a plan shewing the situation of his land, the public stream referred to, and the point at which it is desired to abstract the water.

(4) The applicant considers the following works necessary to obtaining the use of the said water :—

Description of Works.

....
....
....
....
....

(5) The following are the owners of the land which to the best of my knowledge and belief might be affected by the granting of the use of water now asked for :—

(Here give the names of owners and farms affected.)

....
....
....
....
....
....

Affidavit of Applicant.

I,..................................of..............................make oath and say that the matters and things set out by me in the foregoing application are to the best of my knowledge and belief true and accurate.

....

Applicant.

Sworn before me, this......day of.......................19...at.........................

....

Justice of the Peace.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

- Biscuits
- Bread
- Butter
- Confectionery
- Cigarettes
- Dried & Bottled Fruits
- Dried Meats
- Eggs
- Flour
- Flowers
- Honey
- Jam
- Plants
- Poultry
- Seeds
- Sugar
- Tobacco
- Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

RHODESIA

Agricultural Journal.

ISSUED BY

The Department of Agriculture,
SALISBURY, RHODESIA.

ADVERTISEMENTS.

The Journal is issued every alternate month.

Application for advertising space should be addressed to the Editor. The rates are as follows, *per issue*:—

Position.	Whole page.			Half page.			Quarter page.		
	£	s.	d.	£	s.	d.	£	s.	d.
Inner pages - -	**2**	**0**	**0**	**1**	**5**	**0**	**0**	**15**	**0**
Outer cover (back) -	**4**	**0**	**0**		—			—	
Inner covers (back and front) and page facing Contents	**3**	**0**	**0**	**1**	**15**	**0**	**1**	**0**	**0**

A discount of 10 per cent. will be allowed for standing or consecutive advertisements running through six issues. Remittances, and electros where desired, should accompany orders. The right is reserved to discontinue the insertion of standing or consecutive advertisements should payment beyond the second issue be delayed.

The right of approval of all advertisements by the Director of Agriculture is reserved, and his decision as to the acceptance or rejection is final.

An additional charge may be made for advertisements printed in special type, equal to any additional charges made by the printers for setting up same.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock or farm implements, at a minimum charge of 2/6 per insertion of 20 words. Extra words will be charged for at the rate of 1/- for every 10 words.